The CHEMICAL AGE

VOL LIX 16 OCTOBER 1948 No 1527

Safety First

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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Science and Production

SO many of the major industrial developments of the past half-century have been due to the application of science to industry, that it is not surprising that those whose business is production are asking what immediate help can be derived from science in the present circumstances. We need greater production in existing industries. We need means to offset rising prices of labour and raw materials. We need new industries that can find markets all over the world. Science, the world has been told, has been the basis of our industrial development. Now if ever was the chance of scientists to show whether the old basis still stands.

Accordingly, it was almost inevitable among the questions the Government put to its Advisory Council on Scientific Policy was one " regarding the directions in which a scientific approach is most likely to promote an increase in the national productivity." The straight answer seems to be obvious. It is that science also works " in a mysterious way, its wonders to perform." The futility of making out a list of the inventions we desire, setting dead-line dates by which they shall be achieved and put into full production, must be evident to all but industrial commissars. The council very sensibly replied that the application of existing knowledge is of prime importance: " Current fundamental research in the physical and biological sciences is unlikely from its very nature to have any material short-term effect in increasing productivity, whatever may emerge from its results in the future. For short-term results the more effective application of scientific knowledge is likely to prove much more fruitful."

The application of existing knowledge may be more difficult than appears at first sight and may require concentrated scientific effort. The council has therefore noted the value of " operational research " methods that proved so valuable in the Services during the war, and involved the use of scientific methods to provide quantitative data on which executive action could be based. With a view to making these methods more widely known a book is to be published on the subject under the auspices of the Central Office of Information. Operational research has been defined by Prof. Waddington as " the application of the methods of scientific research to the study of problems which face an executive authority." The underlying principle is to collate the results obtained after control of the different variables.

The council has noted four existing problems that are likely to have a bearing on productivity. If it is agreed that the major need is to make use of existing information, how can we be sure that everyone has the information he needs? Sir Harold Hartley, in a report to

On Other Pages

the Federation of British Industries just after the war, maintained that the only effective way was for each firm to have a scientific man on its staff whose duty should be primarily that of keeping in touch with scientific publications and bringing their significance to the notice of his employers. The Advisory Council on Scientific Policy has arranged that there shall be an efficient central information office able to put inquirers in touch with sources of specialist information, since such information is available at the Government research stations, the industrial research associations and other places. The information unit of the intelligence department of the DSIR is also to be expanded to provide a national service of the type required.

The second problem was that of the human factor in production, a subject previously discussed in these columns under the title: "The Problem of Production." Inquiry showed that the level of productivity in different firms within the same industry sometimes varied by as much as 200 per cent and that there was often no obvious explanation of this difference. General economic conditions are often extremely difficult to assess, and in any event cannot account for the differences in the level of productivity between comparable firms. Thus, the concrete objective of raising the level of the least efficient firms nearer to that of the best is in itself well worth pursuing, since it would go a long way to effecting the general rise of 10 per cent in overall output for which the Government has asked. It is therefore recommended that further research should be undertaken forthwith into such matters as the basic conditions of good morale and efficient organisation, the characteristics of successful Joint Production Committees, the status and position of the foreman, the differences of response as between men and women workers and the selection and training of managing staff. Some of the most effective work in this sphere has been carried out by the large chemical and allied undertakings.

Evidence has been given to the council from several sources that the effective application of the results of scientific research by suitably qualified technologists and engineers is an even more urgent need than the furtherance of research itself and would bring much quicker results. The council seems satisfied to record that "already it appears likely that the supply from universities of men with qualifications in applied science would be double what it was in pre-war years." Our own view is that this state of affairs gives no ground for complacency. The supply of chemical engineers, for example, is far below the margin of safety, and seems likely to remain there.

NOTES AND COMMENTS

Inquest on Coal

WHEN the National Coal Board and the Mineworkers' Union were reported earlier this year to have agreed that 200 million tons of deep-mined coal was a reasonable total figure at which to aim during 1948 it was widely commented that this was taking a very cautious view of what could be achieved with the aid of Saturday working by underground workers or the addition of 30 minutes per day. At last week's " inquest " at the Ministry of Fuel attended by the National Coal Board and the National Union of Mineworkers only one thing appears to have been certain, that Great Britain will not have had, for use or sale, 200 million tons of mined coal by the year's end. Whether the deficiency will be 3 million or a good deal more than that may as well be included among the unpredictables which must now be occupying the harassed thoughts of the joint committee which was set up at the Ministry meeting to study the many departments in which pledges of improved working were not honoured and " to recommend the precise steps to be taken." That phrase, from the Ministry of Fuel's Press note, seems to echo the inadequacy of the tactics employed up to now, which have helped to deprive this country of full participation in the best export market that remains to us. The joint committee must by now have recognised that whatever steps are taken must be forceful and long if we are to honour our undertaking to supply next year 8 million tons more coal to Western Europe alone—without resorting to dismal starvation rationing under which our own industries had to strive along little more than a year ago.

New Frontiers

BUT for the benefactions of the first Baron Trent the University College Nottingham might have had no Chair of Chemistry and—a more immediate deprivation to most of us—there would be no Jesse Boot Foundation lectures. One is reminded once again how real would be that loss by the current publication by the University of Nottingham of the 1948 foundation lecture given by Prof. Linus Pauling, which seems to raise to new heights the fine quality which has distinguished former annual studies of chemical knowledge and speculation. In " Molecular Architecture and the Processes of Life " Prof. Pauling gives some fascinating glimpses of the frontiers of chemical knowledge in the field of biology. Here investigation, although frequently baffled, seems to be on the brink of justifying conceptions about the structure and behaviour of some molecules which could revolutionise a great part of existing chemical theory and practice. That this work by, among others, A. Tyler, G. H. Beadle, K. Landsteiner and Prof. Pauling himself is directed principally to support medical research—on which it seems capable one day of conferring new power to combat disease and arrest degenerative processes—does not in the least detract from the prospect of a great impetus in the field of pure chemistry. The study of the viruses, for example, encourages the view that some of the simpler ones at least may be regarded as molecules. This conception has been confirmed by the test of crystallisation. This and the complementary study of the likely basis of combination between antibodies and antigens carries to a plane on which all chemists must be concerned the work of which Prof. Pauling has given so stimulating a survey.

Fluorine Chemistry

THE existence of a fairly large body of chemical substances of whose basic characteristics and potentialities in research and industry much remains hidden must represent an effective stimulant of contemporary chemistry. That is one of the conclusions implied in the revealing study contributed by Prof. H. J. Emeléus to the October number of *Endeavour* of the development of fluorine chemistry. This is the kind of contribution which is very much in keeping with *Endeavour's* questing spirit and is capable of having a profound influence on more than a few of our younger chemists, whose course may still be shaped by some such authoritative presentation, brief though it is, of the geography of a field having almost dramatic possibilities. The knowledge that fluorine, more or less familiar as a compound for

nearly two centuries, eluded direct observation until Moissan, in 1886, prepared the element by electrolysis of a conducting solution of potassium fluoride dissolved in anhydrous hydrogen fluoride may add a zest to future investigation, which fluorine's phenomenal activity and early refusal to submit to ordinary physical restraints will not lessen. Now that some of the problems of handling have been overcome, or at least greatly diminished by fresh knowledge and new equipment the production of fluorine has assumed a much more practical interest and the developments, such as the fluorocarbons of extreme chemical inertness and volatility and the versatile anhydrous hydrogen fluoride, are among the comparatively new implements now fairly freely available for fundamental research and offering possibly fruitful results in industry. The affinity, cited by Prof. Emeléus, of the latter compound with the olefinic and actylenic bonds of organic compounds and its activity as a catalyst in synthesising high-octane petrol are among highly suggestive facets of this provocative subject.

The Perfect Interpreter

THE seven-days' Scientific Film Congress in London which culminated in the day-long summing up on Tuesday may be regarded as having been of historical importance, partly because of the willingness for international collaboration reflected by the participation of 25 countries and the important contribution on crystal structure from the U.S.S.R., and more particularly because of the decisive rôle which continuous photography is capable of playing in scientific affairs. Widely varied as were the views at the congress of what the motion camera can and cannot do, no one has hesitated to admit that cinematography is becoming an essential aid in chemistry, as a recorder of processes much too fast or too slow for the human eye and brain to register, and in nearly every other exact science. Almost inevitably it is taking its place between the useful servant of the records, the photostat, and the revealing high-powered microscopes of recent development. While it may never equal the electron microscope's dramatic powers of investigation, cinematography's gifts as a perfect interpreter, between nations as well as individuals, entitle it to the widest encouragement on lines which the congress sought to promote. In particular, it will be deplorable if the freedom of purely scientific films to pass all national frontiers is curtailed by financial or political barriers.

The Stepney Experiment

IN times when ill-will and mistrust on the individual plane and bad faith between nations form the substance of a disproportionately large part of the news, realists (and even scientists) are entitled to share the sentimentalist's delight in a happy ending. Happy endings to some of the most dismally unpromising stories form the keynote of "Making Good : The Story of Some London Boys—1861-1948," which has come from the Boys' Hostels Association (now completing its 21st year of existence), of which the president is Lord Leverhulme and the chairman Mr. John Benn. In the nine little biographies reproduced here of boys taken on by the John Benn Hostel in Stepney, after the all too familiar miseries between police and probation officers, is solid reassurance that the sinister twist which seems at the moment to run through so much of the contemporary story is not ineradicable. Best of all, these are truth, not fiction, and go far towards proving that the human spirit can still furnish transformations as impressive as any yet produced in the laboratory.

BRITISH PROPERTY IN PALESTINE

BRITISH subjects wishing to register loss or damage of property in Palestine are reminded (in the *Board of Trade Journal*, October 2) that H.M. Government does not accept any liability for compensation for such loss or damage, whether this is claimed under Palestine legislation, under the Palestine Government Notice of May 16, 1947, or otherwise, and whether the claim relates to loss or damage incurred before the termination of the Mandate or as a result of the withdrawal of the British administration. It may, however, in some cases be possible to claim against the successor Government or Governments. H.M. Government will make every effort to ensure that claims of British subjects are expeditiously dealt with by whatever authority becomes responsible in Palestine.

Cinematography in Scientific Research

Dr. S. Fordham on its Use for Recording

IN the absence, through indisposition, of Mr. J. E. Cummins (Chief Scientific Liaison Officer of the Australian Government), Sir Robert Watson-Watt, C.B., F.R.S., presided and performed the official opening of the one-day conference on "The Film in Scientific Research," held under the auspices of the Scientific Film Association, on Tuesday, at the Royal Institution, London. The event constituted a fitting winding-up session of the second International Scientific Film Congress which had taken place in London during the preceding seven days and was attended by delegates from more than 20 countries.

Dr. Watson-Watt referred to the dozen or so peculiar qualities possessed by the cinematograph film in its application to scientific research. The usefulness of the cinematograph camera was, he said, a sort of corollary of scientific processes. It was a kind of time machine, and it provided unimpaired acuity of vision. It was not surprising, therefore, that they had now reached a very advanced stage of application of cinematography to radiography.

At the morning session, Dr. S. Fordham (Imperial Chemical Industries, Ltd.), spoke on "The Film as a Research Tool in Chemistry." He gave an account of the impressions which had been formed in the I.C.I. organisation of the actual use of cinematography as an adjunct to scientific work in the four or five years during which it had been employed. To his mind, one of the greatest benefits of the use of cinematography was that it did not require a great amount of training to understand its technique.

For Industrial Science

For the interest of the industrial scientist, Dr. Fordham mentioned one or two general conclusions which they had arrived at. They had come to regard cinematography very largely as a method of recording. It enabled one to measure something at speed which could then be observed and measured at leisure. But he was bound to say that the cinematograph had not yet shown them anything in regard to chemistry that they had not already at least suspected.

Apart from simple record purposes, said Dr. Fordham, they had been interested in trying to obtain data supplementing their other ideas of how things happened in chemical processes. For example, they had used the cinematograph film in connection with the various aspects of their work on ammonium nitrate.

When they were making microscopic studies in this connection they observed something larger happening at too great a rate for ordinary observation by the human eye, so they decided to use the cinematograph film to show such things as the rate of adsorption of moisture by ammonium nitrate. It had enabled them to conduct further research into the consolidation of this chemical, which had been observed by those who essayed to use it as a fertiliser. The cine film, moreover, had enabled them to observe the crystal transition process in this chemical; the film had actually shown the transition of ammonium nitrate 4 to ammonium nitrate 3.

Dr. Fordham said they had used cine films in studying, among many other things, the chemical reactions of cellulose. Speaking generally, they had found that the cine film was exceptionally useful in physical chemistry research. He thought they would go on and take films at a much higher speed than at present, and would also greatly extend their range.

New Radioisotopes

Value as Research Materials

TWO important new research materials, hydrogen-3 and helium-3, have been added to the radioisotopes distributed by the U.S. Atomic Energy Commission, and are available to scientists and research institutions in limited quantities.

Hydrogen-3, also called tritium, is a radioactive gas with a half-life of approximately 12 years. As the only radioisotope of hydrogen, it should prove of special value as a tracer in medical, biological and chemical research. When combined with oxygen, tritium, can also be used as the valuable research tool known as heavy water.

Helium-3, a stable isotope, is only one-millionth as abundant in nature as ordinary helium, which is used in balloons and dirigibles. It may provide valuable clues to the still largely unknown properties of the helium nucleus.

Tritium is isolated after the bombardment of a lithium compound by slow neutrons in a nuclear chain-reacting pile, and helium-3 is obtained as the end product of the decay of the radioactive tritium.

Important knowledge of the fundamental forces which hold the atomic nucleus together has been gained in experiments with tritium and helium-3 by Dr. Herbert Anderson and Dr. Aaron Novick at the Atomic Energy Commission's Argonne National Laboratory, Chicago, Illinois.

I. G. Farben Explosion

ECA to Allot $6 m. Aid

THE tentative third quarter allotment of the Economic Co-operation Administration funds to the French zone of Germany has been increased by $6 million, partly in recognition of the losses resulting from the I. G. Farben explosion at Ludwigshafen in July.

Mr. Hoffman informed the French ambassador (M. Henri Bonnet) that "for transfers of commodities and service from the Western Hemisphere and other non-participating countries, we have added an amount of $6 million to the $14 million basic tentative allotment. One of the chief factors determining this upward revision was the reduction in exports from this zone on account of the disastrous Ludwigshafen blast."

ECA explained that the higher allotment was not intended to provide funds directly to rebuild the Farben plant, which manufactures colouring products, but was to make more funds available to the zone until normal production and export activities could be achieved again. ECA has been advised that this is expected to be accomplished by January 1, 1949.

AMMONIUM NITRATE TESTS

TENTATIVE results of the experiments with ammonium nitrate stores on the island of Dune, Heligoland, have now been announced by the Home Office.

These tests, held between September 29 and October 2, were being carried out on behalf of a working party appointed by the Home Secretary following the disastrous explosions in the holds of ships at Texas City and Brest in 1947.

The object was to ascertain the effects of intense and prolonged heat on "prilled" ammonium nitrate when stored in bulk. About 240 tons of ammonium nitrate were involved in three trials, one stored in drums in a bunker, and two in barges in which one part was stored in drums and the remainder in paper bags.

No evidence of detonation or explosion was found; further details of the tests are awaited with interest.

Limitation of Advertising.—The Chancellor of the Exchequer's request for the continuance from March 1, 1949, to February 28, 1950, of the voluntary limitation of advertising was considered at a meeting last week of the Standing Advisory Committee of the FBI. A further meeting on the subject will be held shortly.

Magnesia from Sea Water

Increased Output from British Plant

PRODUCTION of magnesia from sea water by the British Periclase Co., Ltd., at its Palliser Works, Hartlepool, is to be stepped up from 27,000 tons a year to 40,000 tons. Mr. Jack Jones, Joint Parliamentary Secretary to the Ministry of Supply, announced this on October 8 when he visited this establishment which is stated to operate the only plant in Europe for the manufacture of magnesia from sea water. The increased output, said Mr. Jack Jones, was necessary for the expansion of the steel industry's output to 20 million tons a year, from its present record output of 15 million tons.

[The importance of magnesia in this connection is in the provision of magnesite for refractory bricks required for the production of basic steel. The increased supply has the further merit of reducing our dependence upon dolomite imports.]

First of Its Kind

The British Periclase Co., Ltd., built for the Government in 1940, when a vast increase in the production of magnesite was called for, a plant at Workington which produced 40,000 tons of magnesia a year. Mr. Jack Jones said these works were the envy of other nations. There was nothing else like them in the world, except in the United States, where they were working in a slightly different way.

When the plant at the Palliser Works was erected in 1937 it was stated to be the first of its kind.

[The establishment by a South African company of a plant at Salomha Bay to extract various salts from sea water was reported in THE CHEMICAL AGE, September 11.]

Mr. Jack Jones said that the industry at Hartlepool showed that private enterprise "could work on behalf of the State in happy co-operation."

Cost of Texas City Disaster

Monsanto Chemical Company announces that it has agreed to accept $17,312,000 in settlement of its insurance claims for damage to its plant in the explosion and fire at Texas City in April, 1947, states a *Comtelburo* report from St. Louis, which says: "Insurance companies here believe this is the largest single claim ever to be paid." The insurance companies concerned are the Oil Insurance Association of Chicago, Lloyd's of London, and a group of American industrial insurance companies.

PRODUCTION & USE OF KEY CHEMICALS

General Increases since July and August 1947

THE latest issue to hand of the *Monthly Digest of Statistics*, published by the Central Statistical Office (No. 33, dated September, 1948), gives figures of production, consumption and stocks in hand of materials connected with the chemical and related industries—among the other principal British trades—for the month of July, and in some instances for August, compared with the corresponding months of 1947 and with the preceding month of this year, and from these the table below has been compiled.

Production in July in these trades shows a pretty general increase over the same month of 1947, and such production figures as are given for August also show a distinct upward tendency compared with August last year. In many instances, however, production was appreciably less than in the preceding month of this year.

Estimated numbers of men and women employed in connection with chemicals, explosives, coke ovens and by-product works were little changed from those of the preceding month, being 240,600 in July and 240,700 in June. Employment in connection with oils, greases, paints, varnish, etc., was also practically unchanged in July —117,00 workpeople compared with 116,000 in June.

	July, 1948 Thousand Tons			July, 1947 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	122.7*	—	70.4*	103.6*	102.0*	65.6*
Sulphur	—	20.8*	80.3*	—	16.0*	70.7*
Pyrites	—	15.7*	62.0*	—	14.2*	73.0*
Spent oxide	—	16.2*	158.2*	—	14.1*	152.0*
Molasses	13.2	34.4†	189.7	11.7	39.2†	106.9
Industrial alcohol (mil. bulk gal.)	2.39	2.20	8.11	2.68	2.82	5.09
Superphosphate	72.0	72.9	87.5	63.0	44.8	154.3
Compound fertilisers	122.3	105.9	135.0	73.0	57.7	105.0
Liming materials	—	341.2	—	—	256.8	—
Ammonia	—	6.37	11.37	—	5.83	3.20
Phosphate rock (agricultural)	—	62.4	164.3	—	54.7	138.9
Phosphate rock (industrial)	—	7.77	22.4	—	4.49	35.4
Virgin aluminium	2.38	12.2	—	2.37	13.3	—
Magnesium	0.24	0.29	—	0.15	0.42	—
Virgin copper	—	25.6	99.9	—	28.9	96.5
Virgin zinc	—	16.1	52.4	—	17.8	30.4
Refined lead	—	16.2	22.3	—	16.1	32.3
Tin	—	2.04	15.7	—	2.30	16.8
Zinc concentrates	—	14.4	47.0	—	13.6	77.0
Pig iron	174.0*	—	282.0*	147.0*	—	380.0*
Steel ingots and castings (including alloys)	284.0*	—	—	245.0*	—	—
Rubber:						
Waste collected	—	0.17‡	9.5	0.03‡	0.74‡	57.3
Reclaimed	0.40‡	0.41‡	3.91	0.41‡	0.39‡	4.89
Natural	—	3.25‡	138.6	—	2.63‡	146.2
Synthetic	—	0.04‡	2.02	—	0.04‡	2.63

* August. † Distilling only. ‡ Average of five weeks.

Reserved Occupations

"Professionally qualified scientists" head the short category, circulated recently by the Ministry of Labour, of persons who may be enrolled provisionally if they volunteer in the event of a national emergency. Pharmacists and radiographers are also mentioned as others whose service would be accepted only provisionally. Part I of this notice, "employments from which for the time being volunteers will not be accepted," includes oil shale mining (underground), iron, steel and metal manufacturing (not processing), gas, water and electricity supply, petroleum production, refining and transport.

Private Imports of Liquid Rosin

The Board of Trade announces that no further purchases of liquid rosin will be made on Government account. Private importers will, however, be required to take one ton from Government stocks for each three tons imported. For currency reasons, importers will be required to give an undertaking that they will sell only for approved purposes and to submit to Raw Materials Department monthly returns of sales and stocks.

Applications for licences to import should be addressed to Import Licensing Department, Board of Trade, 189 Regent Street, London, W.1.

British Steel Casting

U.S. Adoption of Sheffield Process

AWARTIME development of centrifugal casting of alloy steel by Firth-Vickers Stainless Steel, Ltd., Sheffield, is described in the U.S.A. as "the most important development in a generation of progress in alloy steel casting." That assessment of the value of the new technology was made by Mr. W. H. Worrilow, president of the Lebanon Steel Foundry, Pennsylvania, announcing that his company had acquired exclusive rights to use in the U.S.A. the British patent process, which is particularly important in the production of jet-propelled aero engines. It is capable of many other applications. The U.S.A. is spending $500 million in its current programme for the production of military aircraft engines, of which a large proportion employ the turbo-jet principle.

New Engineering Applications

Apart from its immediate importance to warplane engine manufacture, the American industrialist said, the process lends definite promise of adaptability in a variety of new industrial uses. This is particularly true in the case of engineering applications in which highly exacting requirements of heat-resistance and corrosion-resistant service must be met.

Because of the unusual design characteristics and integrity of castings made by the process, the way was opened to production of cylindrical and tubular structures.

Perfected by Firth-Vickers at its Staybrite Works in Sheffield, the "centri-die-casting" process relates to the casting of molten metals and alloys in heavily-constructed moulds while the moulds are being rotated at high speed around their axes. The molten metal is deposited and solidified under pressure within the mould, thereby producing a symmetrical or cylindrical ring of high density with excellent structural properties throughout. The process is specifically adapted to production of high-melting-point alloys and steels ranging from the carbon steel grades to the new super-alloy types developed to withstand the high temperatures of jet engines.

The agreement just concluded between the British group and the Lebanon company relates to production of highly complex centrifugal castings made possible by the new process. Provision also is made for a continuing exchange of technical and manufacturing information between the two companies in regard to corrosion-resistant, heat-resistant steels and related processes, as well as new steels now being developed by Firth-Vickers.

Lowering Aluminium Costs

The American Chemical Process

CHEMICAL engineers attending the American Institute of Chemical Engineers' meeting in French Lick Springs, Indiana, heard Mr. H. W. Heiser, of the research and development department of the Aluminum Company of America, describe a new process which will lead to lower cost aluminium. The new chemical process is used in the production of cryolite in the electrolytic reduction of aluminium ore to the metal. Cryolite is required in large quantities by the aluminium industry.

The new process avoids high temperatures and the use of the highly-corrosive gas, hydrogen fluoride. The inclusion of hydrogen fluoride, in current practice, requires the expensive replacement of equipment destroyed by corrosion, and heavy expenditure on constructional materials to withstand the corrosive attack.

Another advantage claimed for the new process is that it does not require the high purity fluorspar which is the raw material for the manufacture of cryolite, but can make use of fluospar containing appreciable amounts of silica.

The new "Fluoboric Acid Cryolite Process," makes use of a mixture of sulphuric and boric acids which react with the fluospar to form fluoboric acid. This reaction proceeds at moderate temperatures in an open system and without the evolution of corrosive fumes. The fluoboric acid is then allowed to react with soda ash and aluminium oxide to form a high purity cryolite.

U.S. ALUMINIUM PRICE RISE

MARKING the second price rise in three months, the Aluminium Company of America raised the price of pig and ingot aluminium one cent per lb., as from Monday. In making the announcement, which includes higher prices for other of the company's products, Mr. A. Davies, vice-president, said the new price is 16 cents per lb. for 99 per cent aluminium pig and 17 cents for large-sized 99 per cent ingots. Appropriate adjustments would be made in the prices of other products, but the average price of all Alcoa products would remain considerably below pre-war averages. Aluminium ingots were advanced to 16 cents a lb. in July after holding at 15 cents since 1941. The 1939 price, by contrast, was 20 cents a lb. Current aluminium production is in excess of 100 million lb. monthly, but supply is estimated this year to fall short of demand by 400 to 500 million lb.

The ABCM Dinner

Chairman on Current Achievements

A NOTE of confidence regarding the future of chemical production in this country was sounded by Sir Harry Jephcott, chairman of the Association of British Chemical Manufacturers, speaking at the association's annual dinner in London on Wednesday, for which an invitation had been accepted by Sir Stafford Cripps, President of the Board of Trade.

Sir Harry Jephcott recalled the disastrous state of affairs which had existed prior to 1914, when the industry had been unprotected at home, and abroad was defeated by high import tariffs. Now, called upon to play its share in the country's recovery, the industry had been told its duty was threefold; first to provide the essential domestic needs, second to provide essential requirements of those industries the export value of whose manufactured products exceeded that of the chemical ingredients—for instance, dyestuffs for fabrics—and, third, only after meeting both the preceding requirements to export to the maximum possible extent.

The export of chemicals as a whole now stood at 155 per cent by volume as compared with 1938. Of the total chemical products sold at home or exported, and estimated in 1947 to have a value of £233 million, almost 90 per cent were produced in this country.

Finally, the chairman referred to the two major handicaps of the industry: first the inadequate supply of trained and practical men, and, second, plant capacity on which the productivity of the industry depends.

[A fuller report of the dinner will be published in next week's issue of THE CHEMICAL AGE.]

URANIUM FIND CONFIRMED

ANALYSIS at Columbia University, U.S.A., of a mineral found in the rock fissures of the Katanga mines, in the Belgian Congo, has shown that it contains 60 per cent uranium, 15 to 20 per cent vanadium, and 10 to 15 per cent copper. Described as "a hydrous copper-uranium-vanadium mineral" similar to carnotite—except that carnotite is a potassium not a copper uranium mineral—it should be of great strategic value.

The discovery of the new mineral was made by Dr. H. G. Schuilling, chief geologist for the Union Minière, and Dr. Anton Gray, chief geologist for the Kennecott Copper Corporation. It has been given the name of Sengierite in honour of M. Eduard Sengier, managing director of the Union Minière du Haut Katanga, in recognition of his work for warfare mineral production in the Belgian Congo.

School of Pharmacy

Inaugural Meeting

AFTER 106 years, the College of the Pharmaceutical Society, has ceased to exist as such, but continues under the title of the School of Pharmacy of London University, of which the first session was opened on Wednesday, October 6, with the presentation of prizes and an inaugural address by Mr. Thomas Tickle. Among the guests were Mr. I. von Fisenne, vice-chairman of the German Pharmaceutical Society, and chairman of the German Pharmaceutics, Hamburg, and Mr. G. S. Williams, vice-president of the Pharmaceutical Society, Victoria, South Australia.

To Harwell

Prof. H. Berry, the Dean, gave a comprehensive report of the past session. Among the changes in staff was the resignation of Dr. W. J. Arrol, Senior Lecturer in Physical Chemistry, to take up an appointment in research work on radioactive tracer elements at Harwell. In research work some 27 papers had been published, and the international character of the school had been maintained with research workers from China, Czechoslovakia, Denmark, Egypt, India, and Iraq.

As a result of theses submitted to the University post-graduate degrees of Doctor of Philosophy in pharmaceutics, pharmaceutical chemistry, and pharmacognosy had been awarded to . I. Michaels, Y. M. Abouzeid, E. Clarke, J. Das Gupta, K. S. Kaikini, R. A. Kahn, D. V. K. Raju, G. G. Kalthod, A. S. Vyas, R. Glascock, D. Sanyal, and D. K. Santra.

The Dean then referred to the change in character and status of the college. Under its new title of School of Pharmacy it would be mainly financed by grants from the University of London, but would receive contributions from the Pharmaceutical Society. There would be an independent governing body which would consist of himself and four persons nominated by each of the following—the University, the Pharmaceutical Society, and the academic board of the school. The council also had power to co-opt other members from research and industry and these were: Sir Harry Jephcott (elected a chairman), Sir Henry Dale, and Mr. W. J. C. Quarrell.

Mr. Tickle, in his address, dealt with the art of pharmacy—the "hand maid" of medicine—tracing its history from the early apothecaries or shop-keeping doctors to the formation of the Pharmaceutical Society in 1841.

NEW PLASTICS IN THE U.S.A.

World Views Third Exposition

An ivory radio cabinet made from P-8 polystyrene is intact, while a cabinet made from a general-purpose polystyrene has collapsed, after both had been immersed in boiling water for 10 minutes

SOME entirely new plastics and much enterprise in widening the field of application were the distinguishing features of the third National Plastics Exposition, which has been drawing an exceptionally large international following at the Grand Central Palace, New York. Some 40,000 had seen the show when it closed on October 1.

Demonstrations of new processes and special machinery were a distinguishing feature of the show, emphasising the exceptional advances in the technique made since the first exhibition staged in New York in 1946. Many concerns demonstrated all the machine processes used in the industry, such as low-pressure and cold moulding, extruding, laminating, intricate assembly parts, and new applications of infra-red techniques covering everything from the production of rock-hard plastics to delicate fabrics.

Among the foreign visitors, the English delegation included Messrs. L. McArd, chairman of the Moulders Group of the British Plastics Federation; W. Charles Waghorne, immediate past chairman; L. Cornelius, Derwent Plastics, Ltd.; J. E. Elliott, E. Elliott, Ltd.; F. E. Wall, Healey Mouldings, Ltd.; F. M. Herzberg, Hornflowa, Ltd.; H. P. Humphreys, Ranton & Co., Ltd.; P. A. Garrett, Rootes Mouldings, Ltd.; J. Johnston, Universal Plastics, Ltd.; P. S. Adamson, research department, BX Plastics, Ltd., and J. T. Birtwell, of Cascelloid, Ltd.

The list of exhibitors included most of the widely known companies producing basic plastics materials, among them: Dow, Bakelite, General Electric, American Cyanamid, Monsanto, Du Pont, Celanese, Catalin, Owens Corning Fiberglas, Durez, Westinghouse, B. F. Goodrich, Goodyear, Hercules Powder, Koppers, Tennessee Eastman, Libby-Owens-Ford, Borden Co., Glenn L. Martin.

Indicative of the unconventionality of some of the new uses of plastics was a boat developed by the U.S. Navy, representing the largest single plastics job ever moulded in one piece, and a forerunner of larger craft to be built for the Navy. In its plastics hull the boat is capable of carrying 22 men and is virtually indestructible. Painting of the surface is not necessary and Navy tests have shown that the plastic will not scuff, scratch or split. Six men built the hull in six hours. A comparable wooden hull would have required at least 60 hours. The boat is 28 ft. 9 in. long, has a beam of 10 ft. 3 in., and is powered by two petrol engines. It can attain a speed of 19 knots.

High-Speed Compression Moulding

The development by the Libbey-Owens-Ford Glass Company of a new quick-setting plastic material, Plaskon alkyd moulding compound, which is said to broaden the field of use of plastic material, was given its first public showing at the exposition. The new alkyl is designed to advance the use of ultra-high speed compression moulding.

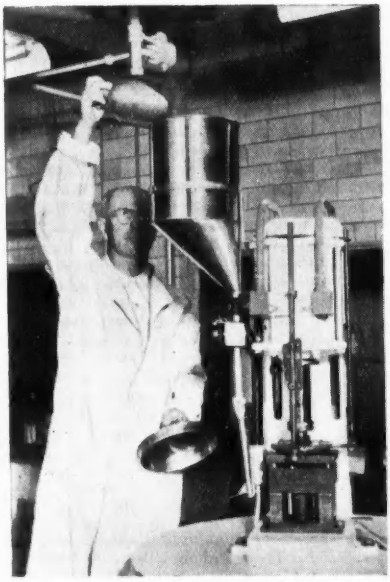
The new compound is a mineral-filled plastic material which is said to possess unusual electric characteristics, high heat resistance, low moisture absorption, unusual dimensional stability and unique moulding properties. It differs from other thermosetting plastics in requiring a very short curing time and it can be moulded in light, high-speed machines.

The new material is offered as being particularly suited for electrical and mechanical applications. Its arc resistance when tested under the standard ASTM procedure is 190 to 200 seconds; the next best standard material yields top values of approximately 140 seconds. The first applications of the new compound are in electrical connectors, switch units and similar parts.

At the show, this new member of the plastic family was transformed from its light brown powder form into finished

sample discs before onlookers. Plaskon had set up a compression moulding machine, which uses air rather than hydraulic compression. It has a moulding cycle six times as fast as standard machines and, in contrast to the massive conventional types, is only 4 ft. high and 4 ft. in circumference.

A new high heat-resistant, monomer-free, non-volatile, polystyrene plastic, embodying three important characteristics not previously attained in material of this type was introduced by the Chemical Division of Koppers Company, Inc. The new plastic, Koppers Polystyrene P-8, is expected to open new fields of use. It is said to be the first highly heat-resistant polystyrene that can be moulded into a glass-clear or coloured product. The new P-8 moulds as easily as the usual grades of polystyrene, whereas highly heat-resistant polystyrenes have presented many moulding problems. In colours, the materials show greater resistance to fading. Uses for which it appears to be especially suited include knife and fork handles, funnels, tea strainers, and other household utensils, brightly coloured radio cabinets resistant to heat from the valves and storage battery cases.



A new moulding press designed and built by Plaskon engineers to exploit the company's new alkyd moulding compound. This machine may be a prototype of a range of light-weight and completely automatic moulding presses

Much of the credit for development of the new plastic goes to Dr. G. F. D'Alelio, assistant director of Koppers research department, who devised a special process for bonding molecules of styrene, the principal ingredient, in long molecular chains and into various chain-like formations. Through the new process, it was possible to set up a control of molecular formations much more precise than previously attainable.

The new plastic is already being produced on a mass basis with production of 1 million lb. a month.

Building Blocks

Indicative of the increasing use of plastics materials in construction, plastic partition blocks resembling glass brick but only one-fifth the weight are now available from the Monsanto Chemical Company's materials. The blocks are being moulded by Columbia Protektosite Company, Inc., Carlstadt, New Jersey, using Monsanto's Lustron polystyrene plastic. The blocks are made with interlocking lips permitting non-load bearing walls to be built without using adhesive or clamps. Monsanto also displayed its Fibestos, a transparent plastic to clarify television images.

Two new basic types of Styron were announced by the Dow Chemical Company. The new materials are Sturon 637 and Styron 475. Styron 475, while basically polystyrene, differs from it in the following characteristics: (1) its elongation at break is approximately 10 times that of regular polystyrene, and (2) its impact strength is three to five times greater. The new material was designed primarily to fill the gap which exists between rigid dimensionally stable polystyrene and the tough cellulosic derivative plastics. Styron 637, the other new material, gives crystal and certain polystyrene colours greatly added stability. It increases colour permanence four to five times in such applications as interior lighting parts, fluorescent diffusers, lamp shades, etc.

Design Exhibition.—The Royal Academy, the Royal Society of Arts and the Council of Industrial Design will collaborate to present on October 26 the story of "Design at Work," an exhibition which will show, for the first time, the stages in the creation of a new product from the first sketches, through models and prototypes, to the finished article as it comes off the production line. It will be the first exhibition of the work of Royal Designers for Industry. It will be opened in London by H.R.H. The Duchess of Kent.

Restoring Japan's Fertilisers

Recovery Hindered by Acid Shortage

BEFORE the war, Japan was one of the three principal producers of synthetic nitrates, with fifteen large factories of total capacity in 1941 of 1,242,000 tons; also eight factories producing 232,000 tons of cyanamide. Imports of crude phosphates were large, and 17 works in 1940 had an output of 1,639,000 tons of superphosphate, and 87,000 tons of basic slag. Most of the potash required had to be imported.*

In 1947 production of ammonium sulphate was 732,000, cyanamide 213,000, superphosphate 705,000, and basic slag 530 tons. Imports since the war have considerably improved during 1947-8. In 1947 they were nitrogenous 240,000, phosphatic 1,038,000, and potash 73,000 tons, those of phosphate being practically the same as pre-war. At the same time it is noted that manufacture of sulphuric acid is not yet sufficient to enable full use to be made of these imports for production of superphosphate.

Average annual consumption during 1936-40 was, in million tons: nitrogenous 1.65 (ammonium sulphate 1.1, synthetic 0.35); phosphatic 1.587 (superphosphate 1.28); potash 0.191 (KCl 0.104); organic residues 1.03 (soya cake 0.232, fish and bone waste 0.723).

The Government has estimated the following as Japan's fertiliser needs this and next year.

	N	P	K	
1948-49	2.23	1.65	0.2	million tons
1949-50	2.32	1.725	0.31	,, ,,

The K as before will mostly have to be imported, as also will much of the N and some of the P, pending complete restoration and extension of the home fertiliser industry.

Fertiliser Finance Scandal

Allegations that 85 per cent of the national fund earmarked for the rehabilitation of the Japanese fertiliser industry had been diverted to one company, the Showa Denko, led to the resignation last week of the Japanese Cabinet. The fall of the Government is associated with the arrest of Mr. Takeo Kurusu, director-general of the Economic Stabilisation Board, alleged to have received bribes, and to have been concerned with the acquisition by the Showa Denko organisation from the Reconstruction Finance Bank of 2867 million yen, ten times the company's capital. Showa Denko is stated to be responsible for only 15 per cent of the country's total supply of fertilisers.

* From a report by Centre Nat. du Commerce Extérieur, Paris—M. Normand, Commercial Attaché.

Amm. Sulphate for India

New Factory Nearing Completion

AT a meeting of the Dominion Parliament at New Delhi, the Minister of Industry and Supply, Dr. S. P. Mookerjee, said that a Government factory for the manufacture of ammonium sulphate was nearing completion at Sindri. Proposals were also being examined, he said, for the development of the iron and steel industry, heavy electrical plant and machinery, penicillin and sulpha drugs and synthetic petrol industries, among others.

With regard to oil, Dr. Mookerjee said that representations had been made to H.M. Government and the principals of oil companies who controlled India's main source of oil supply in the Middle East. As a result, the quantity of oil that was likely to be made available in India during the second half of this year was 12 per cent in excess of that imported in the first half of the year.

Eucalyptus Oil Industry

A conference was held at Ootacamund to ascertain the views of the representatives of the eucalyptus oil industry on the possibility of reorganising it on co-operative lines. Mr. E. A. Lasrado, District Forest Officer, Nilgiris, said that some of the manufacturers of eucalyptus oil regrettably were averse to the idea of forming a co-operative society to put the industry on a proper and scientific footing, thereby withstanding competition from Australian imports, as well as to the idea of forming a joint stock company.

The Government had, therefore, found it necessary to reorganise the industry on a co-operative basis with a view to increasing production through up-to-date scientific methods, and a system of joint ownership for which a co-operative society was thought to be the best agency.

Mr. Lasrado urged that the oil should be prepared for export and should conform to the standards of the British Pharmacopœia. The industry would become extinct if it were allowed to remain in the present condition, he said.

New Fertiliser Plant for Canada.—A proposal to establish a new chemical fertiliser plant, aided by a Quebec provincial government grant, was put forward at the 96th annual exhibition of the Quebec County Agricultural Society. Dr. Gustave Beaudet, of Charlesbourg, told the meeting that the operation of the plant would bring down the cost of fertilisers to farmers from $25 to $5 a ton.

NEW FERTILISER TECHNOLOGY

TVA's Effective Use of Indigenous Resources

by E. P. HUDSON, M.A., F.R.S.*

THE phosphatic fertiliser manufacturing operations of the Tennessee Valley Authority represent the most interesting example in the world of large-scale experiments into new methods of processing phosphate rock. The Authority relies almost exclusively on the indigenous phosphate rock of the region and on the hydro-electric power which is one of the main industrial manifestations of the complex of activities of the area. Whatever their economic justification, even under the unique circumstances prevailing, the TVA processes represent an outstanding contribution to the advance of phosphate technology.

Two main chemical types of manufacturing process can be distinguished: the first is essentially a two-stage process. The first stage is the production of phosphorus pentoxide in forms suitable for its utilisation as a chemical reagent. It is so used in the second stage to break up the apatite structure of the phosphate rock, so as to make the phosphate readily available to plant life.

In this type of process the phosphorus pentoxide not only acts as the disruptive agent, but also contributes to the fertiliser content of the finished product. An economic desideratum is that the quantity of phosphate in the form of reacting agent should be as small as possible in relation to the quantity of phosphate rock acted upon.

In the first stage phosphate rock is reduced to elemental phosphorus in an electric furnace, using coke as the reducing agent and sand as a flux:—

$$3Ca_3(PO_4)_2.CaF_2 + 15C + nSiO_2 + H_2O = 3P_2 + 15CO + 10CaO/nSiO_2 + 2HF$$

(where n equals about 7.52, corresponding to a lime/silica ratio of about 1.33).

The phosphorus is—either at once or else later—burnt in air to phosphorus pentoxide: If at once—

$$P_2 + 5CO + 5O_2 = P_2O_5 + 5CO_2$$

or if later—

$$2P_2 + 5O_2 = 2P_2O_5.$$

It is interesting to note that in the course of these reactions the orthophosphoric form of the phosphate is entirely destroyed and then potentially reconstituted.

Two examples of the second stage of this type of process are:—

(1) Manufacture of triple superphosphate (45/48 per cent available P_2O_5).

The phosphorus pentoxide is hydrated and used in the form of a 75/80 per cent solution of phosphoric acid (H_3PO_4), the reaction being carried out at normal temperatures:—

$$3Ca_3(PO_4)_2.CaF_2 + 14H_3PO_4 = 10Ca(H_2PO_4)_2 + 2HF.$$

(2) Manufacture of calcium metaphosphate (64/67 per cent available P_2O_5).

The phosphorus pentoxide is used in the form of vapour, produced by the burning of elemental phosphorus, the heat of combustion of which is used to keep the reactants at a temperature of 1000/1200°C.:—

$$3Ca_3(PO_4)_2.CaF_2 + 7P_2O_5 + H_2O = 10Ca(PO_3)_2 + 2HF.$$

The water required in the reaction is supplied by that physically associated with the phosphorus as it comes from the condensers after the electric furnaces.

The second main chemical type of manufacturing process is a one-stage process in which the apatite structure of the phosphate rock is broken up by the use of simple non-phosphatic reacting agents. The manufacture of ordinary superphosphate is an example of this type, but in the practice employed by the TVA the reagents are even simpler, namely, water and sand.

The type of disruption of the apatite is chemically simpler also, namely, the removal of the calcium fluoride component only—without alteration of the tri-calcium phosphate component:—

$$3Ca(PO_4)_2.CaF_2 + SiO_2 + H_2O = 3Ca_3(PO_4)_2 + CaSiO_3 + 2HF.$$

From the chemical engineering standpoint, however, the process is difficult, the reaction being carried out with phosphate rock in the molten state at a temperature of 1500°C. or more. The heat is supplied by the combustion of fuel oil, the products of combustion of which supply all the water required in the reaction. The product, fused tri-calcium phosphate (28 per cent total P_2O_5) has interesting and agriculturally useful properties.

One distinguishing feature of the TVA phosphatic fertiliser technology is the relatively high degree of concentration, in terms of P_2O_5 content, of the materials produced. The extreme example of this is the production of elemental phosphorus, with a P_2O_5 equivalent of 22.9 per cent, by techniques which permit its separation as such in form suitable for bulk rail or road transport.

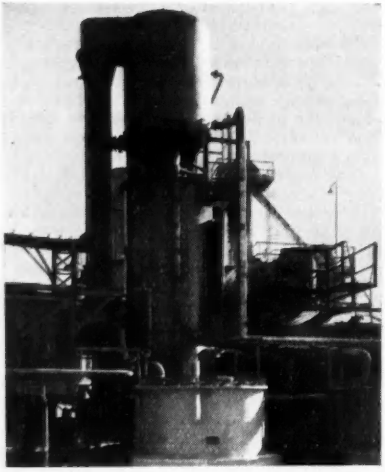
* Synopsis of a paper, "TVA Phosphatic Fertiliser Technology" by Mr. E. P. Hudson presented before the Fertiliser Society in London on October 20.

RECOVERING REFINERY ACIDS

Outline of Monsanto Coke Deposition Process

From Our New York Correspondent

THE recently announced Monsanto-Ross-Wilde process in the U.S.A. for the recovery of sulphuric acid and fuel from oil refinery wastes (THE CHEMICAL AGE, August 28) consists of the deposition of sludge acid in a relatively thin film on coke of 6 to 10 mesh size, and the subsequent heating of the coke to the temperature necessary for the decomposition of the acid.



Gas cooling and scrubbing tower handling combined sulphur dioxide gases from a battery of Monsanto-Ross-Wilde decomposer units and a sulphur burner

Developed in the last year of the war, the process will accommodate nearly all types of sulphuric acid-hydrocarbon sludge. Physically, the only requisite is that the final feed sludge should be in a reasonably free flowing form. Chemically, the final sludge feed should contain a minimum of 0.10 lb. of hydrocarbon per lb. of titratable H_2SO_4.

The new process, according to Monsanto Chemical Company officials, yields over 98 per cent of the recoverable sulphuric acid as determined by methyl orange titration of the sludge feed. The decomposer unit operates at relatively low temperature, limiting hydrocarbon evaporation to only the lightest fractions.

In operation, acid is sprayed or trickled on the coke in an unheated mixer. This mixing outside the heating zone is found to be necessary in order to avoid formation of "sponge" coke and the subsequent crushing or high temperature required to extract the acid. After mixing, the coke-acid mixture is passed into a heated decomposer, which has hitherto consisted of a 24-in. steel tube, having from 16 to 24 ft. of heated length, through which the coke is moved by a plain steel ribbon screw.

The maximum coke temperature which is found to be necessary is around 425° to 450° F. but this applies only to straight alkylation spent acid containing around 90 per cent free sulphuric acid. For normal refinery wastes, which appear to average around 50 to 60 per cent titratable acidity, a temperature of 350° to 370° F. is adequate.

Non-obnoxious coke is discharged from the decomposer and in normal operation contains 1-5 per cent free sulphuric acid, as determined by one hour extraction with acetone. It is returned by elevator through a controllable feeder to the mixer, the product coke being taken off as surplus from the head of the elevator. This product coke ranges from as little as 4-5 per cent acid decomposed with straight alkylation to as much as 50 per cent on acid decomposed with heavier sludges. It contains up to 9 or 10 per cent total sulphur and is quite free-burning in an over-feed stoker.

85 Per Cent Acid Content

Gas from the decomposer affords from 60-85 per cent SO_2 dry basis, depending largely upon the care taken to exclude air in the operation. With the SO_2 there is, of course, water vapour, representing the free water content of the sludge and the water formed in the reduction of H_2SO_4 by hydrogen. There are also varying amounts of hydrocarbon gases, depending upon the type of sludge, small amounts of CO_2 produced in part by reduction of H_2SO_4 by carbon, and in part by combustion of carbon by small amounts of air infiltrating the system.

For operation with sludges of lower strength, gas from the decomposer is ordinarily taken through a small humidifying tower and then to a water-sprayed lead cooler for the removal of condensable hydrocarbons. Hydrocarbon recovery at this point has varied from 5 to 10 gall. to 35 gall. of condensate per ton of 100 per cent H_2SO_4

in the sludge. Condensate varies in colour from a light straw to a dark brown.

Gas from the lead condenser may be handled in two ways. If it is necessary that all contact plant product shall be water white, gas is taken through a combustion chamber for the removal of non-condensable hydrocarbons. By reducing to 3 per cent or less the oxygen in the combustion chamber exit gases an SO_2 content of around 30 per cent, dry basis, can be obtained. Following the combustion chamber, the usual cold gas contact plant purification equipment is brought into use before operation of the converter system.

If, on the other hand, some dark acid can be used, gas leaving the condenser can be dried and scrubbed in 98 per cent acid for the removal of unsaturated hydrocarbons. A small amount of saturated hydrocarbons appears to cause no marked trouble in the converter system. It is, however, necessary that the gases be diluted with air before entering the converter.

Fuel Consumption

Fuel consumption per ton of 100 per cent acid and unit capacity in terms of 100 per cent acid vary with the titratable acidity and with the free water in the sludge to be decomposed. Ordinarily one "double unit" is considered as having a capacity of the order of 20 tons of 100 per cent acid per day, but this may vary from as little as 15 up to 30 tons.

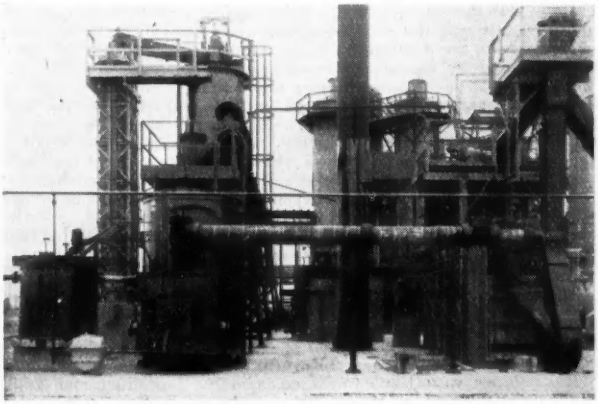
A double unit consists of two tubes mounted side by side in the same furnace and arranged for parallel flow of coke. Fuel consumption is of the general order of 3 million BTU per ton of 100 per cent acid, but this figure will vary with the type of feed.

Monsanto has operated its full-scale pilot plant for a considerable period using the product coke as a fuel. When handled through an "Iron Fireman" over-feed stoker such heating was quite successful, according to the company. In general, the lower the free water in feed acid the better. Optimum strength of feed acid is represented by an acid hydrocarbon ratio giving slightly more than enough hydrocarbon to provide complete reduction by hydrogen. Ordinarily this means a feed acid between 75 and 80 per cent titratable acidity.

Monsanto is stated to be able to supply designs for such plant of any given size and to guarantee its capacity with any given type of sludge. For its successful operation it requires a wet gas purification contact plant if the SO_2 is to be made into sulphuric acid.

Smokeless Fuel

A proposal by Salford Corporation to use its statutory powers to establish smokeless zones in the city, in which only smokeless fuel would be permitted to be delivered to domestic users, will be watched with interest. On the post-war housing estates of Salford dwellings have been provided with grates specially designed to burn smokeless fuel, and it is suggested that these areas shall be extended and restricted by law to the use of such fuel. The prime difficulties in connection with this scheme have been brought to the Salford Corporation's notice by coal merchants, whose co-operation was sought. These are stated to be that smokeless fuel is available only in limited quantities, also that Coalite—the potential solution of the problem—is expensive.



Monsanto-Ross-Wilde process for sludge acid recovery: combustion chamber and scrubbing tower (left), single decomposer unit (right), as added to an existing contact sulphuric acid plant (background)

STUDIES IN TANNERY CHEMISTRY

Some Vegetable and Metallic Processes Reviewed

AT the recent annual general meeting and conference of the Society of Leather Trades Chemists, held at Leeds University, papers were read of which the following summaries are representative.

"A New Method of Determining the Acidity in Tan Liquors and Its Application to Vegetable Tanning," by D. Burton, M.B.E.

Research work was being done to find methods of differentiating between the different kinds of acidity in a vegetable tan liquor. The aim was to get a better system of tanyard control by determining (1) the natural acidity, that is, acidity not due to the tannins, (2) the free carboxyl groups of the pyrogallol tannins, and (3) the phenolic hydroxyl groups of pyrogallol and catechol tannins. All the results are reported in mg. equivalents per litre of liquor. This will enable the tanner to ascertain what part the natural acidity plays in tanning and to follow the changes in the pyrogallol tannin contents of his liquors.

Determining Acidity

Previous work was reviewed and eight methods of determining acidity were studied It is concluded that the Cameron-McLaughlin and ALCA official methods are not sufficiently accurate for determining natural acidity. An anion exchange resin method was described which gave promising results for the natural acidity. Titration of the undiluted liquor to *p*H 6.5 (or a little below 6.5) gives the natural acidity plus that due to the carboxyl groups of the pyrogallol tannins. Thus the latter can be obtained by difference. It is necessary also to differentiate between the salts of weak acids (buffer salts) and the salts of strong acids.

Buffer salts are determined by titration to *p* H 2.0 and by the alkalinity of the ash method, which is considered more accurate. The total salts are determined by the Cheshire-Brown-Holmes method, and by estimating the SO_4 in the sulphated ash of the liquor. The Procter-Wilson theory of vegetable tanning was discussed.

It was shown that dry-pelt can contain as much as 24 per cent Wilson-Kern fixed tannins when tanned with pure gallotannic acid in the absence of natural acids. Gallotannic acid contains no carboxyl groups but a large number of hydroxyl groups like a catechol tannin. It was concluded that tannin is fixed by the following reactions: (1) direct fixation without the intervention of natural acids, (2) indirect fixation when the pelt first combines with the natural acids, and possibly by (3) hydrogen bond fixation. The causes of the unaccounted for loss of tannin in making leather were discussed.

"Solubility and Other Studies on Quebracho Extract," by T. White.

Examination of the solubility curves of a mixture permits determination of the number of components in the mixture, the solubility of each component, and the extent to which each component is present in the mixture. This technique has been applied to several vegetable tannin extracts. In the case of quebracho extract, the method shows that the extract contains five major components and a quantitative separation of the components can be based on the data from the solubility curves.

Light absorption and refractive index curves confirm this finding. The solubility curve method can be co-ordinated with results obtained by filter-paper partition chromatography, and new developments of this latter technique were described. These show that one of the main components of quebracho extract is itself complex and consists of probably eight flavone-like substances. The general finding is that the tannin extract is extremely complex and probably contains four types of tanning agents, a result which is important in relation to earlier speculations as to the structure of quebracho "tannin."

"Recent Studies of the Chemistry of the Liming Process," by Joane Bowes.

Recent work on the chemistry of the liming process was discussed. In liming, a variety of factors must be considered: (1) removal of hair, (2) chemical action of the alkali on the skin collagen and other proteins such as elastin and reticulin and (3) physical actions on the skin, such as swelling and opening up.

Acidity

Removal of the hair is dependent on the breakdown of the disulphide link in the keratin molecule; this is favoured by increase of hydroxyl ion concentration and of unhairing agent. Recent views on the mechanisms of the reactions involved were discussed.

Chemical action on the skin collagen is comparatively small except at *p*H values above about 13.0. Hydrolysis of amide groups is the chief reaction involved, and modification of the guanidine groups of argenine occurs to a very small extent. There is some breakdown of peptide links, including those involving proline and hydroxyproline, and a little collagen is dissolved.

The uptake of water from solutions of sodium and calcium hydroxide and from sodium hydroxide-sodium chloride, calcium hydroxide-calcium chloride and calcium hydroxide-sodium chloride systems was considered. Dr. Bowes concluded that decrease in cohesion of the collagen as well as osmotic effects plays an important part in determining water uptake. High *p*H values and the presence of salts favour decrease in cohesion.

"Scientific Experience," by R. H. Marriott.

The assessment of quality and its maintenance had, in the past, been dependent upon the judgment of the experienced craftsman. His standards, which are mental ones, are derived by means of sight, feel and taste. Although such an assessment is purely a qualitative one, it does enable a random batch of samples to be arranged in an order of goodness which finds general but not, perhaps, universal agreement not only with those who handle the product as part of their business, but also with the ultimate consumer.

The impact of science has led to an attempt to evaluate quality in terms of figures which should give a degree of preciseness which heretofore was lacking. It is an unfortunate fact, however, that many of the laboratory methods of assay, especially those used for purposes of process control, are not so comprehensive as those employed by the practical expert, and owing to randomness of quality often coupled with large and indefinable experimental errors, the values are prone to lose a great deal of their meaning.

In order to combat this weakness of the scientific approach, it is vital that the scientist handles his data in a proper manner, remembering that if science is to cut out the personal factor and is thus to become the means by which experience can be registered in definite steps of value, then the scientific data must be dealt with as a coherent collection of facts, and not as a multiplicity of isolated figures.

"Recent Studies in Chrome Tanning," by Prof. Edwin R. Theis, Division of Leather Technology, Institute of Research, Lehigh University, Bethlehem, Pennsylvania.

The subject matter was given in two parts. The first part covered certain studies relative to the basic and dicarboxylic acid content of collagen and the effect of the depilation process upon these constituents. In addition certain swelling data were given relative to the plumping obtaining within the skin itself.

The second part of the talk dealt with the layerwise (stratiassessorgraphic) distributions of the various constituents in tanned and untanned animal skin. Layerwise distribution of the various constituents of vegetable tanned sole leather, of formaldehyde tanned leather, of iron tanned leather and of chrome tanned leather was shown by means of slides. In addition the layerwise distribution of salt and natural fat of cured stock was shown and the change in natural fat of the animal skin followed through the processes of depilation, bating, pickling and tanning.

The data given will be of value both to the research chemist and to the production man, and will be, it is believed, of real value in assessing many of the qualities of finished leather, especially if such work is tied in with the so-called photomicrographical assessment data.

Scottish Industrial Projects: Full Support by Authorities

GRANGEMOUTH Town Council is preparing to house the largest industrial development ever scheduled for the area and has been given priority facilities by the Government to enable adequate location of the industries involved. These are the £11 million expansion programmes of I.C.I. Dyestuffs and Scottish Oils and the new petroleum-chemicals project sponsored jointly by the Distillers Co., Ltd., and the Anglo-Iranian Oil Company.

To accommodate the new workers some 900 houses are being scheduled in the burgh; the Department of Health, the Ministry of works and the Air Ministry have all given facilities to enable early construction of these houses.

The adjacent town of Falkirk is to share in this expansion. There the British Aluminium Co., Ltd., will carry out an extension costing some £500,000 and thus still further establish Falkirk as a major centre of the foundry and aluminium industry. Here, and in other areas, a main problem of industrial development is the provision of adequate housing. New houses will go largely to key workers who will be brought in from other areas.

Another project, now in the development stage, involves re-opening of steel industry activity at Mossend. The Colville works there have been relatively idle since the end of the war and have been partially occupied by the Ministry of Works. Colvilles, Ltd., have now asked the Ministry to vacate the plant.

Dutch Insecticides and Fungicides

A Progressively Expanding Industry

A RECENT official survey furnishes some data about the relatively rapid development of these industries in Holland. From the Dutch standpoint, this publication is timely, having in mind the general aim, stimulated by the encouragement provided by ECA condition that the recipients of Marshall Aid should strive to intensify their home production and thus strengthen their economic independence.

Arsenate Products

It appears that calcium arsenate, which serves to fight the potato plague of the colorado beetle, is at present being turned out in adequate volume at Arnhem, and some of it elsewhere. Production of lead arsenate does not yet appear worth while, its consumption in Holland thus far amounting only to some 200 tons a year, compared with 1000 tons of the calcium chemical, of which Holland has become an exporter.

On the eve of the war Britain and Belgium were among the principal suppliers of calcium arsenate. The arsenic needed is met partly from a by-product of the well-known tin smelter of Arnhem, but the supply has still to be supplemented by importation of trioxide of arsenic.

The less hazardous fluoric poisons are being produced at Vlaardingen and Utrecht, and the basic material is obtained from superphosphate factory production. The use of fluoric insecticides in Holland itself is negligible, while, according to *Economic Information*, they are applied in the tobacco farming of the Netherlands Indies. Barium chloride for the making of fluoric insecticides has still to be imported.

Prussic acid is made in a factory at Dordrecht near Rotterdam at a rate of 3 kg. a week. The gas is handled and carried in high pressure " bombs," this method having been especially evolved here. It is claimed that Holland is the only country in the world to use this method. Prussic acid is being produced, as far as Europe is concerned, in Britain, Spain and Holland only at present.

Lack of " bombs " and of other adequate packing materials is an impediment to a quickening of development in kindred fields. Soviet Russia has shown some interest for Dutch-produced prussic acid.

Concerning " contact " poisonous material as opposed to the above-named " stomach " poisons, it is reported that DNOC, a sodium salt, is being made at Delden, home produced orthocresol furnishing the basic compound. The manufacture of the salt ammonia at Delden commenced during the second world war. It is handled in paste form and, moreover, the manufacturing firm has patented a special procedure of pressing the product (a powder) into small blocks of 250 gm. each which are easily soluble in water. It is used in rose nurseries, arboriculture (in place of Carbolineum), etc., to the extent of 350 tons annually. Some quantities of orthocresol still need to be imported from Britain for this manufacture.

Another factory, situated at Krimpen-on-Lek, has resumed the making of DNOC, but recently the plant has been removed to Doesburg. This insecticide has proved its efficacy also in destroying weeds in grain and flax.

The Dutch production of nicotine is not sufficient to meet the national needs. The two factories of Oud-Gastel and Wormerveer supply only 6000 tons, so that the use is restricted to greenhouses. The inadequacy of the nicotine supply is curious if one thinks of the extensive production of leaf tobacco in the Netherlands Indies. The Wormerveer factory will, it is hoped, double its output of nicotine by the beginning of next year.

Rotenon base insecticides (derris and lonchocar roots) are produced in Appeldoorn, Hoogkerk, Groningen, Rotterdam and Tiel. Six firms supply hexachloride cyclohexane (666) in Holland (at Deventer, Diemen, Rotterdam, Linne-Herten, Weesp and Blaricum), while DDT is made at Oss, and hexaethyl tretraphosphate at Rotterdam.

Copper Sulphate Plan

Dealing with fungicides, the report says that schemes are taking shape to manufacture in Holland sulphate of copper as well as oxychloride of copper. It is hinted that a commencement will be made with this production at Hengelo this year. Apart from covering the home demand, these products will be exported as well. Britain and Belgium were suppliers of copper sulphate latterly on account of German inability.

Seed disinfectants on quicksilver basis can be readily exported as only 200 tons per annum are needed in Holland, while the production amounts to 1000 tons. Sweden, Denmark, Finland, Belgium and France are the chief outlets. Seed protecting compounds on a hormone basis are lately being produced at Amsterdam.

SCIENCE AND THE TEXTILE FIBRES

The Chemical and Physical Studies of Flax

THE prospect of substantial advances in linen textile technology arising out of chemical and physical studies and the increased use of chemical processing material was indicated in the first paper presented at the opening of the Autumn session of the London and South-Eastern Counties Section of the Royal Institute of Chemistry. The occasion was the presentation of a paper, "Research on Linen," by Dr. A. J. Turner, M.A., D.Sc., director of Research of the Linen Industry Research Association, and the discussion which followed.

Dr. Turner said that research on linen was primarily concerned with the preparation and properties and the various possible combinations and modifications of the natural fibre—flax. The most important research work on linen had been done some thousands of years ago when the fundamental principles of flax production, spinning, weaving, and bleaching had been discovered and developed. The recent scientific era had merely carried those principles further.

Various raw materials—flax among them—had had the scientific spotlight focused on them, and co-operative research associations had been set up to study them. The Linen Industry Research Association was thus founded in 1919, in the expectation that it would help the industry to reduce its costs and to improve its products and its conditions of work.

With lantern slides, Dr. Turner then briefly reviewed the present state of knowledge of the flax fibre. He contrasted it with cotton and jute in chemical composition and physical dimensions and properties, and sought to link these with one another, and with the form and structure of the fibres, taken either singly or in combination.

The Flax Structure

He emphasised the importance of the structure of a single ultimate flax fibre, as deduced from microscopical, chemical, and X-ray evidence. A single flax ultimate contains some 30 billion cellulose chain-molecules, and the structure suggested at increasing magnification was admittedly speculative and subject to correction, but was designed to present a complete picture of a single fibre.

Dr. Turner mentioned a number of points at which research of the Linen Industry Research Association had been of practical benefit in flax production, spinning, weaving, bleaching, dyeing, and finishing. New processes had been developed by which to bleach linen without damage, and new tests introduced to control the operation at every stage; processes had been devised for getting bright colours on linen, with better penetration and improved fastness; and a new process had also been developed for crease-resistant finishes.

Dr. Turner concluded with a description of the situation and facilities of the Linen Research Institute at Lambeg, Co. Antrim, seven miles south-west of Belfast; this was illustrated by slides showing aerial views of the institute and "stills" of its laboratories and technological rooms.

Points of Discussion

In the discussion which followed, Mr. S. G. E. Stevens asked if in preparing flax for bleaching all the wax was removed, or whether the wax content of the fibre was merely reduced; and, in view of the affinity of flax for water, was the tearing strength of flax canvas after a period of exposure affected by mould growth? He asked also if any work had been done on the use of flax for the determination of auxins?

Dr. Turner said that the preparation of flax for bleaching was essentially a scouring process, and even the most effective treatment only reduced the wax content of the fibre to about one-quarter of its original value, although the subsequent bleaching reduced it still more.

With regard to mould growths, it had been suggested that flax would be more prone to mould attack than cotton; but work carried out in 1930 had shown that, provided the flax yarns had been boiled so as to have a residual alkali solubility of not more than 5 per cent, trouble due to mould growths was not likely to be experienced.

The suggestion that flax might be used in the determination of auxins was an interesting one, but no work had been carried to this end.

Dr. K. G. A. Pankhurst commented on Dr. Turner's statement that the flax fibre is highly organised, with a high proportion of crystalline material in the structure. He compared flax with animal fibres, *e.g.*, collagen fibres, which also possessed highly organised structures in the natural state, but when subjected to any "man made" process rapidly degenerated into a disorganised state with a high proportion of amorphous material. He asked if the same process of degeneration was observed in the flax fibre?

Dr. Turner agreed that the cellulosic fibres do not appear to degenerate as readily as the

(*Continued at foot of page* 528)

Predicting Gas and Fluid Behaviour

Engineering Studies of Heat and Mass Transfer*

THE calculations of heat or mass transfer involve either empirical equations based on experiments and on dimensional analysis or theoretical equations. The empirical principles were applied to heat and mass transfer in regular and in random packings of towers and transfer equations valid for certain specified conditions were derived. The theories of turbulent flow given by Osborne Reynolds were extended by Prandtl and von Karman to the investigations of Stanton, Nickuradse and Fritsch on fluid flow in pipes. An analogy between the transfer of heat and the transfer of momentum is now discernible.

The theories were further advanced by the author to explain his results on the distillation of ethanol-water mixtures in rough and in smooth wetted wall columns. The results for smooth walls obeyed the Chilton-Colburn equation but those for rough walls showed an increased rate of transfer with a much greater pressure drop for which no existing theory applied.

The transfer resistance of the laminar and buffer layers and of the turbulent core were separately evaluated from theory and the transfer equations were simplified by the substitution of values for the Schmidt and Prandtl numbers.

This further theoretical advance was applied to problems of transfer in packed towers for which published data existed. It was considered that the loss of energy due to the promotion of turbulence by the packings would not influence the heat and mass transfer from the fluid to the packed bed. The efficiencies of the various packings were proportional to the ratio of the observed to the calculated values of the transfer coefficients.

Experiments on porous "celite" spheres gave unity for this ratio, other less efficient packings gave lower ratios, pointing to poor gas or liquid distributions.

The theoretical equation based on velocity traverses in a uniform tube proved capable of predicting rates of heat or mass transfer in regular or random beds of packings with an accuracy at least comparable with that of the experiments.

* Abstract of a paper presented at a meeting at the College of Technology, Manchester, on October 9 of the Institution of Chemical Engineers, North-Western Branch: "Fluid Friction, Heat and Mass Transfer in Turbulent Flow," Mr. W. S. Norman, M.Sc.

SCIENCE AND THE TEXTILE FIBRES

(*Continued from page 527*)

animal fibres. Even after treatment with caustic soda in the mercerising process, the fibres still contained a high proportion of crystalline material. Rayon, however, contains only 25 per cent of crystalline material, and although its tensile properties may be improved by a stretching technique, this appears to be due to producing better orientation of the existing crystallites rather than an increase in the total number of crystallites present.

Mr. H. L. Bennister asked if synthetic detergents, finding increased use in the textile industry, had been investigated as possible materials for the processing of flax? Dr. Turner explained that although the possible use of synthetic detergents was being borne in mind, the final controlling factor in technological studies must always be the economic one.

At present alkali detergents such as soda ash and caustic soda were cheaper than the synthetic detergents and this militated against their use except for special purposes. However, if synthetic detergents could be produced at a competitive price there would no doubt be a future for them in the linen industry.

KIESELGUHR IN SOUTH AFRICA

THE diatomaceous deposits of South Africa, with special reference to kieselguhr, form the subject of Geological Survey Memoir No. 42, issued by the Union Department of Mines. The main section has been compiled by Mr. L. E. Kent, F.G.S., with a section on diatom flora by the late Dr. A. W. Rogers, F.G.S., F.R.S.

Up to 1942, nearly all the kieselguhr produced in the Union came from Bankplaats, some 300 miles east of Ermelo. Since then, other deposits have come into production or await exploitation; details are given of the prospecting work with results obtained, and estimates of possible reserves of diatomaceous earth.

Sections are devoted to imported kieselguhr and possible local substitutes, the mining of local deposits and preparing the infusorial earth for market are dealt with. The Union's output has increased from 240 tons in the first quarter of 1947 to 640 tons in the first quarter of the current year, according to figures of the Department of Mines.

American Chemical Notebook

From Our New York Correspondent

CHEMICAL process industries in the United States are working at a higher level than ever before with an annual output of $30 billion, according to Sidney D. Kirkpatrick, editor of *Chemical Engineering*. In a semi-annual review of the industry Mr. Kirkpatrick reports that plant expansion has made good progress and most of the delay due to wartime shortages eliminated. Good prospects for the future are augured by research and construction programmes in hand and it is expected that production this year will exceed 1947 by at least 5 per cent. A notable trend in the industry has been the migration of process plants from the eastern seaboard to the south-west and far-west attracted by lower power and fuel costs, abundant raw materials and efficient transportation to growing markets in those areas. Growing industries which are increasing their chemical needs include plastics, rayon, fertilisers, paints, varnish and lacquer, petroleum, rubber, pulp and paper, and iron and steel.

* * *

The English firm William Butler & Company (Bristol), Ltd., distillers of tar and suppliers of rosin and petroleum since 1843, are to be represented in America by the Coaltar Chemicals Corporation, New York City. A wide range of coal-tar chemicals of British manufacture will thus be distributed in the United States by the corporation, which will carry on its regular business as before.

* * *

Plutonium, the man-made element in the atom bomb, is now being produced at the Government's plant, Hanford, Washington, on a factory-scale, according to Mr. David E. Lilienthal, chairman of the United States Atomic Energy Commission, in his address to the Executives' Club, Chicago. Their city, he said, had become a major atomic research centre. The cost of the new home of the Argonne laboratory would represent an investment of about $60 million. Reactors planned for Argonne included atom power plants for propelling ships and naval vessels. Meanwhile, in St. Louis, Missouri, Mr. C. L. Karl, area manager for AEC, announced a modernisation and construction programme costing $2.5 million has been started at the Mallinckrodt chemical works for the better processing of uranium materials.

* * *

Methods for safe handling and storage of hydrofluoric acid are set out in chemical safety data sheet SD.25, the 25th of a series of manuals published by the Manufacturing Chemists' Association Inc., Washington, D.C. Hydrofluoric acid, an extremely hazardous material, was marketed 25 years ago in wax bottles, generally found only in laboratories, whereas to-day the anhydrous and aqueous acids are commonly shipped in tank car lots, and are widely used in the chemical industry.

* * *

Production of primary aluminium in the United States in July was 52,937 tons, a gain of 9 per cent over the previous month according to the U.S. Bureau of Mines. Imports of aluminium ingot were 5886 short tons, receipts from Canada being below the average, but increased shipments from Europe (mainly from Switzerland), helped to meet the deficit. Exports during July were also lower than June, the principal recipients being Asia, South America, and Africa.

* * *

Commercial production has been started by the Carbide and Carbon Chemicals Corporation of three new glycols, butanediol-1,3, 2-methylpentanediol-2,4, and octylene glycol, which have been found effective as plasticisers for animal glues, casein, cork gelatine, polyamide resins and zein compositions, and useful as coupling or blending agents in textile, leather and metal cutting oils. Solvents for natural gums and resins, the new glycols are also described as useful as intermediates for alkyd and plasticisers for synthetic resins. This is believed to mark the first commercial production in the U.S.A. of butanediol, a mild-odoured, colourless liquid, miscible in all proportions with water and alcohol and less volatile and more viscous than its lower homologues, ethylene glycol and propylene glycol. The hygroscopicity of butanediol is regarded as being about 60 per cent of glycerol and three times that of octylene glycol. Derivatives are less water soluble and more soluble in hydrocarbons than those of ethylene glycol. Octylene glycol, colourless, is a 1.3 diol of low volatility and is said to be the first commercially available glycol having limited water-solubility. Its viscosity is much greater than that of the lower diols, but less than that of glycerol. It is about one-tenth as hygroscopic as glycerol at 65 per cent relative humidity and at 21°C.

S. American Coal and Steel

U.S.A. Aiding Big Production Schemes

NEW evidence of increasing interest and widening collaboration of the U.S.A. in the industrialisation of the Latin-American countries is contained in the announcement made last week in Bogota of the establishment of a coal mining and iron smelting corporation, the Empressa Siderurgica Paz Del Rio. Capitalised with the equivalent of about £14.5 million, of which the Colombian Government is providing 51 per cent and private investors up to 20 per cent, one of its chief intangible assets will be the technology and close collaboration of two U.S. companies, the Koppers Company, of Pittsburg, and the Freyn Engineering Corporation, of Chicago.

The Institute for Industrial Development which will provide part of the capital began the project in 1940 and estimates that production capacity of the new company will be 500 tons of iron a day for at least 50 years. The new company is the fourth enterprise of this type in Latin America, the Institute said. The others are in Mexico, Brazil and Chile.

The company's properties are located in the department of Boyaco and cover an area of 45 square kilometres where coal and iron will be mined. To aid the undertaking, the Government is making tax concessions and permitting free imports of materials and equipment.

300 Per Cent More Steel

Meanwhile, in New York, Virgil Stark, president of North American Utilities and Construction Corporation, addressing a meeting of the National Association of Steel Exporters, said that while the Argentine iron and steel production expansion programme provides for increasing steel making capacity by 300 per cent, it will even then cover only about 35 per cent of that country's domestic needs.

The Armco International Company is building a steel plant at San Nicolas, Argentina, for an output of 400,000 tons per year in 1951. Mr. Stark told the exporters that the South American markets for steel and steel products presented a more stable and important long-term opportunity than European markets.

Literature describing a tin content indicator has been prepared by the Wheelco Instruments Company, 847 W. Harrison Street, Chicago 7, Illinois. The bulletin also provides a technical explanation of the method of determining the tin content of a solder batch.

Rubber Research in U.S.

Use of Radioactive Isotopes

FRESH methods for improving the vulcanisation of rubber by means of radioactive isotopes are now being used by the B. F. Goodrich Company as a result of work in their newly-completed research centre at Brecksville, Ohio. Three main kinds of radioactive isotopes are being used by the technical experts. They are:—

Radioactive sulphur to study the vulcanisation of rubber to determine the disposition of this vulcanising agent in the final product.

Radioactive iodine to measure the thickness of thin films in the neighbourhood of one micron, difficult to measure by more conventional methods; this is part of a study to determine the mechanism by which silicones reduce the adhesion of ice to rubber-like material and plays an important part in improvements to de-icers for aeroplanes.

Radioactive phosphorous for improving tests in abrasion and tyre tread wear. Dr. Howard E. Fritz, vice-president of the company's research, said that among the projects undertaken is one in which radioactive tracers are added to a chemical solution through which the tyre cords are passed, and radiographs reveal the amount of penetration and whether it is uniform.

In other uses, several radioactive chemical accelerators have been made, including zinc dimethyl dithiocarbamate, tetramethyl monosulphide, and tetramethyl disulphide for use in experiments in vulcanisation.

A number of interesting developments are expected from the discovery of beta-propiolactone, announced by John L. Collyer, president of the B. F. Goodrich Company. As a result of reactions with this new chemical, patents have been granted to the company for the production of new compounds estimated to produce a variety of end-products ranging from weed-killers and plastics to plant hormones and compositions which increase the wear-resistance of leather.

Scottish Hydro-Power Charges

The North of Scotland Hydro-Electric Board has stated that it cannot differentiate between industries in the rating of its power, no matter how desirable it may be that certain industries should be located in the Highlands. This follows the suggestion advanced by the Scottish Council (Development and Industry) that the establishment of electro-chemical and electro-metallurgical industries in the Highlands might be conditional upon their ability to obtain power as cheaply as it is offered in Norway or other foreign countries.

Technical Publications

OVERCOMING the difficulties of foaming is clearly and concisely set out in a booklet describing the uses of Antifoam A, a Dow Corning silicone product, distributed by Albright & Wilson, Ltd.

Antifoam A, an effective foam suppressor, is a colourless, translucent silicone compound which retains its honey-like consistency at temperatures ranging from −40° to over 200°C. (−40° to over 392°F.). Physically inert, it is tasteless, but has a very slight not unpleasant odour. It may be taken internally in relatively large quantities without ill effect, and does not irritate the skin.

The most effective use naturally depends on the foamer involved. In some cases a portion of DC Antifoam A may be added before foaming starts, in others it may be added during the foaming, until the foam is suppressed. In most instances, however, the more convenient method has been found to add the silicone product dispersed in one of the solvents listed in the booklet.

Although the cost of Antifoam A is more than that of other foam suppressors, it is stated to be frequently more effective in smaller concentrations, and in many cases cheaper to use. Its usefulness has been established in laboratory distillations, processing of chemicals, in the paper and synthetic rubber industries, the manufacture of gums and synthetic waxes and in soaps and wetting agents.

* * *

James Wilkinson & Son, Ltd., Tinsley Park Road, Sheffield 9, has issued a new list in booklet form of some of their principal industrial chemicals, including hydrofluoric acid and a wide variety of fluorides. Data of approximate analysis, properties and uses are shown in tabular form.

* * *

German methods of producing iron powder in a ceramic tunnel kiln are described in an information circular by the Bureau of Mines as a supplement to four other Government publications describing the Bureau's research on brick-yard sponge iron. German methods of producing iron powder in a tunnel kiln are a further development of the process used commercially since 1911 at a ceramic plant in Hoeganaes, Sweden, and this process was further developed during the war by the Bureau of Mines, resulting in the adaptation of ceramic tunnel kilns to the solid-carbon reduction of iron ores. Highly technical, the circular describes in detail the use of the German kiln and the costs of producing iron powder. Copies of the circular, No. 7473, may be obtained free from the Bureau of Mines, Publications Section, 4800 Forbes Street, Pittsburgh 13, Pa.

The portable model, less than 8 in. long and weighing about 7 lb., of the recording vibrometer newly produced by the (U.S.) General Electric Company. All vibration frequencies from 10 to 120 cycles per second in rotating plant are transmitted through the probe, amplified and continuously recorded on a waxed paper chart

Although the chemical industry has its own special fire hazards, the risk of conflagration arising from causes common to other industries are also continually present. It is to draw attention to these that "Fire Prevention Notes for Industrial Premises" has been issued by the Fire Protection Association. The booklet covers the many common causes of fires with sensible advice and information for their avoidance.

Economic Survey of Switzerland.—The latest volume in the series of Overseas Economic Surveys, published for the Export Promotion Department of the Board of Trade and available from H.M. Stationery Office (2s.) deals with economic and commercial conditions in Switzerland.

A CHEMIST'S BOOKSHELF

Electrolytic Polishing and Bright Plating of Metals. S. Wernick. (Foreword by Dr. U. R. Evans.) London: Alvin Redman, Ltd., 1948. 8vo. Pp. xv + 243; 30s. net.

Apart from the admirable survey of electrolytic polishing contained in the first section of the Proceedings of the 3rd International Electrodeposition Conference, recently published (THE CHEMICAL AGE, August 7 and September 4), this work by Dr. Wernick appears to be the first book in English to be published on the subject. It is, however, a relatively small book, and of the 175 pages of actual text—the remainder being appendix, bibliography, and index—about half are devoted to electrolytic polishing, and the other half to plating or deposition. It is, therefore, a comparatively expensive publication. Dr. Wernick is, however, one of the leading specialists in this particular field, and few could be more competent than he in critically surveying the great mass of periodical literature and patents, of which over 500 references are given; and in sifting out and concisely presenting the really important facts from a practical point of view. Thus we have a veritable *multum in parvo*. While interesting aspects of theory have by no means been neglected, the work is evidently intended both for the practical polisher and electroplater, and for the student about to enter the works or laboratory in this rapidly developing and highly important field of industry. It contains a brief and clear account of electrolytic polishing of stainless steels, carbon steels, nickel, aluminium, copper, silver, plating with bright nickel, copper and silver, deposition of precious metals—platinum, palladium, rhodium—and industrial applications of electro-polishing to non-ferrous metals. The appendix deals with bright nickel plating in America. There can be no question about the great industrial importance of this comparatively new method of surface finishing, compared with the much more laborious mechanical polishing; nor of the very keen interest evoked in engineering, metallurgical, and general scientific circles. But, as the author very truly points out, in early stages of development of new processes, the useful information which may be gleaned from voluminous dissertations is apt to be disappointingly small. In the present work he has therefore attempted to enunciate clearly the principles of electrolytic polishing and bright plating, so far as these are understood, and to give useful working details of established processes. In this he has very ably succeeded. An unusual and valuable feature of the bibliography is the inclusion of very brief abstracts with the more important references.

Dipole Moments—Their Measurement and Application in Chemistry. R. J. W. Lefèvre. London: Methuen & Co., Ltd. 1948. Pp. 117. 5s. net.

The volume is one of Methuen's monographs on physical subjects, a series intended to supply readers of average attainment with a compact statement of the modern position in each subject. The student and research worker in physical chemistry will find in this book expositions by an author who is actively engaged in research work on this subject and who, besides, was professor of chemistry at the University of Sydney. The contents are divided into six chapters, dealing with: dielectric polarisation and the calculation of dipole moments; practical methods for the measurement of dipole moments; solvent effects in dipole moment measurements; dipole moments and molecular structure; intramolecular rotation and flexibility of molecules; and some anomalous dipole moments. A table of dipole moments, a guiding index and a list of references are of great use for the study of the empirical connections between dielectric constants and other properties of chemical compounds, a branch of science which can be traced back to Faraday (1837) and other earlier literature and which, although given here in a concise form, is comparatively fully quoted and discussed for the reader's benefit.

The Textile Institute announces that it will publish soon an important work, "Fibre Science," dealing with the constitution, structure and behaviour of fibres. The work consists of a series of post advanced lectures delivered last winter at the College of Technology, Manchester, and is edited by Mr. J. M. Preston. It covers sixteen papers by distinguished scientists examining the physical and chemical characteristics of textile fibres.

Home News Items

New Chemistry Department.—The development of a full-scale chemistry and pharmacy department at Robert Gordon's College, Aberdeen, is indicated by the decision of the Scottish Education Department to sanction the expansion, the reason for which is given as " probable future development trends."

Giant Crusher for I.C.I.—On two days recently officials of I.C.I. limestone division stood on the steamship *American Veteran* at Manchester dock and watched the unloading of a 438-ton gyratory crusher. The crusher, built by the Traylor Engineering Co., Ltd., of Ohio, was ordered to meet the increasing demand for limestone. For the sea voyge from New York it was split into more than 60 different parts.

Scottish Gas Turbine.—" In Scotland, the first trials of an open-cycle gas turbine have already taken place, and a gas turbine capable of developing 12,500 kilowatts for land use is now under construction," said Dr. James M. M'Neill, assistant managing director of John Brown & Co., Ltd., Clydebank, in his presidential address, in Glasgow recently, to the Institution of Engineers and Shipbuilders in Scotland.

Britain's Coal Production.—The total output of coal in Britain last week was 4,153,500 tons (deep-mined 3,917,400 tons, open-cast 236,100 tons). This was the highest total for four weeks and was an increase of 30,200 tons over the previous week. The total production, however, fell short of the weekly average of 4,336,000 tons of deep-mined coal, necessary until the end of the year if the target of 200 million tons is to be reached, by 418,000 tons.

Tender for Shares.—Tenders for the purchase of shares, subject to direction of the Custodian of Enemy Property in England, are invited by the Board of Trade for the following companies: (1) Nitsche & Gunther British Optical Company, Ltd., manufacturers of spectacle lenses, frames, and all types of accessories. Share capital: Nominal £51,686. Issued: £43,487, in ordinary shares of £1 each fully paid. Offered for sale: 29,637 ordinary shares of £1 each fully paid. These shares were previously offered in July, but withdrawn on representation of several interested parties that insufficient time had been given. (2) St. Andrew Mills, Limited, manufacturers and producers of cellulose, wadding, crepe, tissue, and other light tissues, etc. Share capital: Nominal £120,000. Issued: £90,001, in 90,001 shares of £1 each fully paid. Offered for sale, 12,000 shares of £1 each fully paid.

River Pollution.—The Lune Board of Fishery Conservators has approved a recommendation of its Pollution Committee that legal proceedings should be instituted against the Lancaster Corporation for an injunction and costs in respect of damage to fishing reaches at Skerton caused by pollution from the corporation's pumping station.

Outsize Chemical Vat.—Robert Airey and Son, Ltd., King's Bridge Road, Huddersfield, who are among the largest vat builders in the country, have under construction, for use in the chemical industry, a wooden vat of 30,700 gal. capacity. Made from three-inch timber, it is 28 ft. in diameter and 8 ft. deep. It will weigh over eight tons when empty. The largest vat ever made by the company was 35 ft. in diameter, holding 75,000 gallons.

No Housing Priority for Industry.—Morecambe Town Council Housing Committee, after studying a request from the general manager of the Shell petroleum refinery at Heysham for the allocation of council houses for key personnel at the factory, has decided to adhere strictly to the allocation of houses on an approved "points" system and to give no preference to industrial priorities. The Shell application was supported by a letter from the Ministry of Fuel and Power.

International Meeting of Leather Chemists.—Belgium, Great Britain and France were elected founder members of the International Union of Leather Chemists at the recent meeting at Leeds University of the provisional executive committee. Applications for admission have been received from Holland, Italy, and Switzerland. An invitation from the French Society of Leather chemists to hold the international conference in Paris in September, 1949, was accepted.

Coke Oven Gas for Steel Industry.—The opinion that Glasgow Corporation should utilise a daily surplus of 1 million cu. ft. of coke-oven gas said to be available at Dumbreck Colliery, Kilsyth, is expressed by Councillor Victor D. Warren, chairman of the Progressive Party in the Corporation, in a letter to the Lord Provost (Sir Hector M'Neill), in which he says: " It is fully admitted that the question of obtaining surplus coke-oven gas is one for the steel industry, and the likelihood is that the Scottish steel industry will require and use any surplus which it manufactures in the course of its operations."

PERSONAL

DR. L. WHITBY has been appointed director of the Paint Industries Research Institute, Durban, South Africa, and is consequently relinquishing his post of chief research chemist to High Duty Alloys, Ltd. Dr. Whitby was for several years head of the technical division at the Paint Research Station, Teddington.

Thos. W. Ward, Ltd., has appointed as additional local directors—MR. C. PARRY, MR. D. F. WALTON, MR. W. HALL and MR. H. H. MUMBY. Mr. Parry and Mr. Mumby have for many years been closely connected with the company's shipbreaking activities, and Mr. Hall with scrap iron and steel. Mr. D. F. Walton, son of the assistant managing director of the company, is connected with the company's activities as railway siding consultants and contractors.

President Truman has appointed DR. KARL T. COMPTON, the American physicist, as chairman of the Armed Services Joint Research and Development Board. Dr. Compton will replace DR. VANNEVAR BUSH, chairman since 1946.

MR. H. TILSLEY has been appointed assistant sales manager (export) of the British Aluminium Co., Ltd., as from October 1. MR. W. H. MARSTON is relinquishing his position as manager of the Leeds branch office, and will be transferred to London branch office on November 1. MR. A. E. HEELEY has been appointed manager of the Leeds branch office from the same date.

MR. NORMAN AUBREY DORE, of Kingsgate Bay, Kent, who left £6490, bequeathed the residue of his estate, after certain bequests, to the Royal Metal Trades Benevolent Society, of which he was chairman.

Frozen Food Investigation

To secure the fullest co-operation and collaboration between the various research organisations engaged in the field of food and to ensure that inquirers will be directed to the best sources of information, the Frozen Foods Consultative Group was set up last year and is now announced for the first time. This is an informed group consisting of representatives of research organisations official and semi-official, under the chairmanship of the Director of Food Investigation, Dr. Franklin Kidd. It will collaborate with seven of the principal research organisations and has power to invite to its meetings representatives of other bodies. The secretary of the group is Mr. P. R. P. Claridge, Food Investigation Organisation, Lloyd's Bank Chambers, Cambridge.

METAL PRICES RAISED

THE maximum prices of copper, lead, zinc and zinc products, and aluminium, have been raised as from October 1, states the Ministry of Supply, the new maximum prices per ton being :—

Electrolytic copper, £140, an increase of £8; good soft pig lead, £112 (+£22); good ordinary brand zinc, £92 (+£17); zinc sheets, £104 (+£17); zinc oxide (white seal), £89 15s. (+£14 5s.).

Virgin aluminium in ingot form is advanced from £80 to £87 a long ton, delivered consumers' works, with an addition of £2 10s. for metal in notch bar form.

All these increases are stated to be due to the high cost of imported supplies.

Wolfram ore was quoted in London last week at 105s. to 112s. 6d. a unit, c.i.f. European ports, compared with 102s. 6d. to 110s. previously. Tungsten ore has been raised from 102s. 6d.-110s. to 105s.-112s. 6d. a unit.

Steel Industry's New Record

The highest September rate of output ever achieved was reached by the steel industry last month, with a total at the rate of 15,435,000 tons a year.

It now seems more than probable that the steel workers will beat the stiff 1948 production target set by the Government of 14,500,000 tons. The only danger is the failure of supply of raw materials; more scrap than ever is required.

Record Bauxite Figures

Domestic mine production of bauxite in the U.S.A., 367,973 long tons, established a new post-war record in the second quarter of 1948, increasing 21 per cent over first-quarter output, according to U.S. Bureau of Mines. Imports of bauxite, 604,337 tons, were also greater, reaching the highest level recorded, so that the net total new supply of bauxite was 16 per cent greater than in the first quarter, and was also a new record. Mines in Arkansas furnished almost 95 per cent of the domestic total.

Plastics Information Service

A new information service dealing with the application and fabrication of laminated plastics will be inaugurated shortly by the design section of De La Rue Insulation, Ltd. This is the latest activity of the section, which was set up after the war to assist architects, designers, builders, shop fitters, furniture makers, bar fitters, transport undertakings, hospitals, stores, etc., on any problems related to the use of Formica and other De La Rue laminated plastics.

Overseas News Items

Malayan Tin Exports.—September shipments of tin from Malaya showed an increase of 1363 tons more than the previous month, the total of 5782 tons being the highest monthly figure since April this year, following the raising of the official price.

Research Work Destroyed by Fire.—The cosmic ray laboratory of Melbourne University's physics school was severely damaged by fire on October 6. This was the second outbreak in less than a week, and the result of two years' research, which was nearing completion, was destroyed.

New Portuguese Chemical Company.—The Companhia Portuguesa de Fornos Electricos S.A.R.L. has been formed during August with a capital of Esc.6,000,000,000. It proposes to erect a plant for the manufacture of calcium carbide, calcium cyanamide and other compounds, states the Dutch paper *Economische Voorlichting*.

Tin Study Group.—Proposals for the reorganisation of the International Tin Study Group are likely to be put forward by the Belgian representative at the next meeting on October 25 at Scheveningen, Holland. The reconstitution is suggested following complaints that under the present system consumers have an undue advantage over producers.

U.S. Steel Shortage.—Demand continues to exceed supply in the American steel industry, particularly for plates, sheets, strip, bars and some wire products, and it seems improbable that the tonnages required for the final quarter of the year will be obtained. At the current rate of production it is estimated that U.S. steel output should reach approximately 88 million tons this year, and the accumulation of orders should be overcome by the end of next year.

Aid to Canada's Textile Industry.—Of considerable interest to Canadian textile processors is the announcement that the widely-used water-repellent finish, Aridex, will soon be made in Canada by the chemicals group of Canadian Industries, Ltd. This product, previously imported from the U.S.A., will be manufactured at Shawinigan Falls, Quebec, and production is now beginning. Aridex products in various concentrations can be readily applied by one bath treatment to silk, viscose rayon, cotton, cellulose acetate, wool or nylon, the manufacturers claim.

Soviet Seeking Rubber.—Russia, reported recently to be purchasing a large part of Malaya's rubber output, was stated authoritatively last week to have offered to buy Ceylon's rubber crop for 1949 and current stocks available now.

Another Atomic Laboratory.—A powerful instrument of nuclear research was dedicated at the U.S. Cornell University by Prof. I. Rabi, of Columbia University, on October 8. There is a $2 million laboratory with a synchrotron capable of developing 300 million electron volts for nuclear fission. The synchrotron is expected to bring new knowledge of the meson.

Industrial Diamonds for U.S.A.—The purchase in Britain of a substantial quantity of industrial diamonds for the United States Government stockpile has been announced in London by Mr. Thomas R. Finletter, leader of the Economic Co-operation Administration mission to the United Kingdom. The diamonds were bought from the Industrial Distributors' (Sales) Corporation.

Petrol from Vegetable Oils.—A process for the production of petrol direct from cotton seed has been established by the East African Agricultural Research Institute. This information is revealed by the report of the Indian Government Trade Commissioner in East Africa for the year 1946-47, which states that the process is protected by a British patent which has been placed on the secret list. Since the extraction of edible oil from the available cotton seed is a priority demand, no steps have yet been taken for the commercial production of petrol.

Australian Zinc.—Mainly due to the increased production from Mount Isa mines, Queensland, the output of zinc in Australia is expected to rise to the pre-1943 average of 230,000 tons a year. The present production is 170,000 tons, of which 80,000 tons is in the form of electrolytic zinc from works at Risdon, Tasmania, the concentrate being obtained from the Broken Hill mines, New South Wales, and Read-Rosebery mines, Tasmania. These works have a total capacity of electrolytic zinc of 96,000 tons, which with the Mount Isa increased production will make about 150,000 tons of concentrate available for export.

Next Week's Events

MONDAY, OCTOBER 18

Royal Institute of Chemistry (London and South-eastern Counties Section), Dartford, County Technical College, Essex Road, 6.30 p.m. A. E. J. Pettett: "Effect of Cyanides on Treatment of Sewage in Percolating Filters."

Electrodepositors' Technical Society, Northampton Polytechnic, St. John Street, Clerkenwell, E.C.1. G. E. Gardam and J. F. Mills: "The Surface Appearance of Polished Metals—Physical and Psychological Considerations."

Society of Chemical Industry (Chemical Engineering Group), Geological Society, Burlington House, London, W.1. 5.30 p.m. R. S. Morse: "Recent Developments in High Vacuum Technology."

The Chemical Society (Oxford), Alembic Club lecture. Physical Chemistry Laboratory, South Park Road. 8.15 p.m. Dr. A. D. Walsh: "Aspects of Vapour Phase Oxidation."

TUESDAY, OCTOBER 19

The Chemical Society (Southampton), Joint meeting with Portsmouth and District Chemical Society, Municipal College, Portsmouth, 7 p.m. Dr. F. P. Bowden: "Tribochemistry and the Initiation of Explosives."

Society of Dyers and Colourists (Huddersfield section), Field's Cafe, Westgate, Huddersfield. 7.30 p.m. D. R. Lemin and I. D. Rattee: "The Levelling Properties of the Acid Dyes—Quantitative Migration of Dyes."

WEDNESDAY, OCTOBER 20

Royal Institute of Chemistry (London and South-Eastern Counties Section), Royal Society of Medicine, 1 Wimpole Street, London, W.1. 6.30 p.m. Dr. J. G. Fife: "Protection of Chemical Inventions."

The Fertiliser Society, 44 Russell Square, London, W.C.1, 2.20 p.m. A. E. Snell and E. P. Hudson: "Tennessee Valley Authority's Activities and their bearing on Phosphatic Fertiliser Technology."

Irish Chemical Association, Trinity College, Dublin. 7.45 p.m. Prof. Wheeler: "The Training of a Chemist."

Manchester Federation of Scientific Societies. Institution of Structural Engineers, College of Technology, Manchester, 7 p.m. W. Bates: Chairman's address, and "Design for Arc Welded Structures." (Technical film).

Manchester Metallurgical Society, Engineers Club, Manchester. 6.30 p.m. A. H. Goodger: Presidential address.

THURSDAY, OCTOBER 21

The Chemical Society, Edinburgh. Joint meeting with local sections of Royal Institute of Chemistry and Society of Chemical Industry. North British Station Hotel. 7.30 p.m. Prof. J. W. Cook: "Some Aspects of the Chemistry and Biochemistry of Polycyclic Aromatic Hydrocarbons."

The Chemical Society (Hull). Joint meeting with University College Scientific Society and local sections of Oil and Colour Chemists' Association, University College. 6 p.m. Dr. A. E. Alexander: "Surface Chemistry—Its Achievements and its Future."

Textile Institute (Lancashire Section), Manchester. 7.15 p.m. H. W. Best-Gordon (Courtaulds, Ltd.): "Chemical Aids to Textile Processing and Finishing."

FRIDAY, OCTOBER 22

The Chemical Society, Birmingham University, Edgbaston. 4.30 p.m. Sir Cyril Hinshelwood: "Cell Growth Phenomena and Chemical Kinetics."

WHY OUTPUT FALLS

THE great reduction of productive effort and the psychological and economic forces which had contributed to bringing it about were the subject of an address by Sir Ernest Benn, president of the Society for Individual Freedom, at the first of the autumn series of members' luncheons held at the Connaught Rooms last week.

Taking as his subject "The State Cannot Do It," Sir Ernest Benn said that man-hour output in industry was calculated by some to be half what it was in pre-war days. Figures from the Ministry of Health disclosed that in the building trade man-hour output was one-fifth of what it was before the war.

Now we had 45 million or more people, each forced to conform to a plan, each enjoying social security and full employment with little or no risk and no necessity to give satisfaction to anyone. What we did not get was output; the standard of living was going down and we were getting nearer every day to the condition of starvation. He suggested that in that circumstance we were witnessing the biggest psychological blunder in all history—complete misunderstanding of human nature and complete undervaluation of the quality of the human being.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

INTERNATIONAL ELECTRONIC CORPORATION, LTD., London, S.W. (M., 16/10/48.) September 10, £400 debentures, to S. Remenant, London; general charge. *Nil. Dec. 31, 1946.

THERMIONIC PRODUCTS, LTD., London, E.C. (M., 16/10/1948.) September 15, charge, to Midland Bank, Ltd., securing all moneys due or to become due to the bank; general charge. *Nil. April 28, 1948.

Satisfaction

WM. BOWKER & SONS, LTD., Sheffield. (M.S., 16/10/1948.) Satisfaction, September 11. £3500, registered July 3, 1937.

Company News

H. Stout & Co. has been formed into a limited company under the title of **H. Stout & Co., Ltd.**

The nominal capital of **Chegwyn Rawson Research Laboratories, Ltd.,** 105 Station Road, Edgware, has been increased beyond the registered capital of £1500 to £3500, in £1 ordinary shares.

New Companies Registered

Turkdean Ltd. (459,344).—Private company. Capital £100. Directors: A. Monteith, C. E. J. St. John Evers, E. Wall, W. Leyland and A. G. F. Leather. Solicitors: Greenwood Milne & Lyall.

Riley's (Shepherds Bush), Ltd. (459,572).—Private company. Capital £4000. Manufacturing or wholesale or retail chemists. Directors: C. F. Casy, A. L. Jones. Reg. office: 20 Shepherds Bush Road, W.6.

Horn Construction Co., Ltd. (459,610).—Private company. Capital £1000. Constructional and chemical engineers, manufacturers of alloys, oils, chemicals, and manures. Directors: T. Horn and E. E. Horn. Reg. office: 114 Victoria Avenue, Grays, Essex.

Astra Chemicals, Ltd. (458,863).—Private company. Capital £1000. Manufacturers, exporters and importers of chemicals, gases, drugs and medicines, etc. Directors: A. R. Baker, H. A. Hann. Reg. office: Astra House, Midsomer-Norton, Som.

C.S.A. Chemical Company, Ltd. (459,639). Private company. Capital £1,0. Manufacturing, research, dispensing and analytical chemists. Directors: C. W. J. Arber, W. H. Claringbould and G. H. Smallwood. Reg. office: 9 Glenthorne Gardens, Ilford.

Controlathe Co., Ltd. (459,638).—Private company. Capital £100. Plastic moulders and mould makers, electronic and chemical research engineers. Directors: G. M. Baigent. Reg. office: Swinton House, 324 Grays Inn Road, W.C.1.

Stonehouse Tablet Manufacturing Co., Ltd. (459,627).—Private company. Capital £5000. Drysalters, manufacturing chemists. Director: G. Stonehouse. Reg. office: Oaklea Mills, Oakleys Road, Long Eaton, Derbyshire.

Garston Bottle Co., Ltd. (459,009).—Private company. Capital £450,000. To acquire the business of glass makers and dealers carried on by G B C Vendors, Ltd. Directors: W. D. Redmond, W. A. O'Reilly, F. G. Macalpine, J. J. Calder, G. C. M. Barlow, J. M. Barlow, J. W. Joyce and R. H. C. Whiteway. Reg. office: Off Window Lane, Garston, Liverpool, 19.

Chemical and Allied Stocks and Shares

APART from continued strength of British Funds, stock markets have been only moderately active and price movements showed no particular trend, although in the industrial sections individual features were not lacking. Sir Stafford Cripps's reference to iron and steel was taken in the market as indicating that the iron and steel nationalisation Bill is to be introduced shortly by the Government. Nevertheless, it is still assumed that in any event, nationalisation cannot be effected before 1950.

Shares of chemical and kindred companies have been firm and inclined to be more active, because in many cases the companies are playing an active part in the export trade drive. Moreover, rearmament will, in some cases, also mean more business. On the other hand, it is pointed out that dividend limitation prevents the payment of higher dividends.

Outstanding feature has been continued demand for Imperial Chemical, which have risen further to 47s. 3d. with the new shares

(20s. paid) at 26s. 9d. It is being pointed out in the market that there is still a not unattractive yield compared with the return on other leading industrial shares, and that the directors have stated that they expect to be able to maintain the 10 per cent dividend in future on the larger capital. Elsewhere, Monsanto Chemicals have gained 1s. 3d. at 60s., Fisons were 59s., and Albright & Wilson 29s. 3d., while Laporte Chemicals 5s. ordinary changed hands around 20s. 9d. Borax Consolidated firmed up to 60s. 6d. at which there is a yield of 4⅛ per cent on the basis of the 12½ per cent dividend, which the market is confidently expecting to be maintained. At 47s. 6d. British Aluminium have been firm, awaiting details of the expected £1,500,000 issue of 3 per cent debentures. United Molasses improved to 47s. 10½d., Turner & Newall were 77s. 1½d., and British Oxygen steady at 98s. 1½d.

British Oxygen is among leading industrial companies which have stated that in due course more capital will be required for expansion of the business. Results of British Celanese are due shortly, and there are rumours that more capital may also be needed in this case, which it is being suggested in the market, might be obtained by the issue of further preference shares. It is believed in the City that many important new issues are held up for the time being, awaiting a better turn in international affairs and a return of more active markets.

Shares of companies with coke ovens have remained speculatively active on market estimates of "break-up" values, but the value of the shares will in most cases turn on the amount actully offered by the National Coal Board for the coke oven assets of individual companies. British Benzol fluctuated sharply and are 91s. 3d. at the time of writing, with Benzol and By-Products at 12s. 9d. Staveley were active again on market hopes of prospects of a part return of capital and have risen further to 89s.

In iron and steels, Baldwins (Holdings) 4s. shares were steady at 9s. 6d. following satisfaction with the maintained 16 per cent dividend. Guest Keen were 48s. 6d., United Steel firmed up to 29s. 7½d., awaiting the financial results, while Babcock & Wilcox were good at 72s. with Stewarts & Lloyds at 56s. Colvilles at 38s. were good following the interim dividend. In other directions, Boots Drug changed hands around 52s. 6d., Sangers were 30s. 9d. with Beechams deferred at 18s. 6d., and British Drug Houses 5s. shares 9s. 6d. Glaxo Laboratories were £18¼. British Glues & Chemicals 4s. shares were 20s. Oils moved narrowly, Shell and Anglo-Iranian easing to £8 5/16 and 75s. respectively.

British Chemical Prices

Market Reports

PRESSURE for supplies characterises most sections of the industrial chemicals market, although delivery specifications under existing contract commitments are being met with satisfactory promptness. Inquiries for shipment have again been on a good scale, with buyers rather more insistent on firm delivery dates. The main price changes have been in the non-ferrous metal compounds as a result of the metal price increases, and, following the rise in the lead oxides, reported last week, an advance of £14.15 per ton in the price of zinc oxide has been notified. The copper compounds are also dearer. In the soda products there has been no improvement in the soda alkalis position, and chlorate of soda supplies are barely sufficient to meet current requirements. The potash chemicals are firm and available parcels are quickly taken up. Business in the coal tar products has been good with the home and export demand for pitch on a good scale. Xylol supplies are a little easier and it is contemplated that export licences will be granted for limited quantities.

MANCHESTER.—Reports from the Manchester chemical market during the past week show that here and there the recent advances in the prices of the non-ferous metal compounds resulting from the sharp rises in the metals have affected the volume of new inquiry, but this is expected to be only temporary. In most other sections of the market, especially in the alkali products, a steady demand has been reported and new bookings have included a fair amount of business on overseas account. Quotations generally are on a firm basis. In some of the fertiliser materials current buying is on a good scale, and a steady demand exists for most of the tar products.

GLASGOW.—The volume of business which has been transacted in the Scottish chemical market during the past week has been somewhat higher than recently and there has been generally a better tone. A large demand for sodium chlorate remains unsatisfied, but generally the supply position has been fairly satisfactory with the exception of zinc sulphate, for which there is now a prolonged delivery period. In the export market there has been little change, although a number of orders for zinc oxide were received, presumably because news of the likely increase of metallic zinc had reached continental buyers.

Scottish News

Marine Oil Monopoly

BECAUSE no oil reduction plant has, so far, been established at Yarmouth, Scottish oil reduction plants erected by the Herring Industry Board in north-east and north-west Scotland for dealing with surplus fish will remain in operation during the English season.

A fleet of twelve specially chartered Norwegian freighters each carrying 1000 to 1200 crans will be operated by the board to transport any surplus fish from East Anglia to the oil reduction plants at Lerwick, Fraserburgh, Wick and Stornoway.

This transportation of surplus herring should become unnecessary when the plans for the development of oil reduction plant at Yarmouth are put into effect.

The main problems in establishing such a plant are the extensive and expensive arrangements required to handle a product which is seasonal, and not always reliable. These factors tend to increase overheads and limit the reduction of prices which could be done if the plant was working on a continuous maximum output through the whole year.

Co-operation for Exports

A promising policy being sponsored at the Hillington Industrial Estate, Glasgow, by firms there whose work is complementary in the export field, proposes that the firms should group themselves into a single body for export promotion and publicity. This experiment follows the recent suggestion by Sir Joseph Maclay that smaller Scottish firms might well consider the advantages of making a drive for export trade by co-operative enterprise. The prospect of fuller backing by the Scottish banks is under discussion.

Steel Plans "Inadequate"

"The much-advertised development plan for the steel industry produced by the present steel combines is wholly inadequate for Britain, and certainly inadequate for Scotland," declared Mr. John Heenan, Glasgow, in his presidential address to the 33rd annual conference of the Scottish Council of the Labour Party, which opened at Ayr on October 1. It was untrue, he said, to state that the industry in Scotland was in a healthy condition and able indefinitely to continue to increase production. The party's long-term policy recognised that the steel plant in Scotland was, on the whole, inefficient.

Phosphoric Insecticides

Berlin Chemist's Findings

A SECOND paper by Dr. R. Riemschneider (THE CHEMICAL AGE, July 24) in *Pharmacie*, Vol. 3, No. 11 (1948) deals with insecticides containing phosphorous. From the product known as hexaethyl-tetraphosphate and called bladan, the author could distill 30 per cent tetraethyl-pyrophosphate as a much stronger insecticide. An ester mixture is probably formed at the bablan process of the approximate formula $(C_2H_5O)6P_4O_7$, in which hexaethyl-tetraphosphate is only partly contained.

The presence of esters with higher contents of phosphoric acid or of higher contents of metaphosphoric acids can be supposed. As tetraethyl-pyrophosphate is very effective, it is advisable not to aim at a product of the summaric formula $(C_2H_5O)6P_4O_7$, but to produce (C_2H_5O)-$6P_2O_3$.

The investigation of several blaban preparations has proved that a relation exists between the quantities of tetraethyl-pyrophosphate obtainable by distillation and their efficiency as insecticides. The article presents comparisons with various customary insecticides and many tables and a comprehensive list of references.

CANADIAN CHEMICALS

THE $4 million addition to the cellophane plant of Canadian Industries, Ltd., at Shawinigan Falls, Quebec, is expected to be completed in 1951. When in operation the enlarged facilities will increase production 200 per cent over its pre-war output.

* * *

Other developments of Canadian Industries, Ltd., include: More than a million dollars on a new sulphuric acid plant and a new employee welfare building at Hamilton; a nitric acid plant is being installed at Nobel and is expected to be in operation shortly; modern material handling equipment is being installed at Windsor; while at Brownsburg the plastics plant is being enlarged and production has now begun of nylon staple fibre in the new equipment installed at Kingston.

* * *

The world population could be supplied with salt from Windsor, Ontario, for 90,000 years, according to Mr. Deniger, Quebec city sales representative of the salt division and chemicals group of Canadian Industries, Ltd. Mr. Deniger, who was addressing the annual convention of the Quebec division of the Allied Trades of the Baking Industry of Canada, stated that a solid bed of rock salt, approximately 3000 square miles in area, ranging from 200 to 400 feet thick, was available in the Windsor district.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted wi be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2 at 1s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Process of forming laminates of plastic material impregnated fabrics and the products resulting therefrom. A. H. Stevens. (Swedlow Aeroplastics Corporation.) Aug. 28, 1945. 608,138.

Process for freeing gases from phosphine and/or arsine together with any sulphuretted hydrogen present.—Solvay & Cie. Dec. 31, 1943. 608,237.

Synthetic resinous moulding compositions. —J. Allan. Oct. 23, 1945. 607,885.

Discrete materials having water-repellant properties.—Derbyshire Stone, Ltd., and J. W. Hobday. Nov. 3, 1945. 607,968.

Polymerisable organic materials and polymers thereof.—I.C.I., Ltd., and R. Hammond. Nov. 7, 1945. 607,888.

Extraction by organic solvents of sulphur from material containing free sulphur and inorganic compounds.—W. C. Holmes & Co., and C. Cooper. Dec. 5, 1945. 608,143.

Process for manufacture of glucose by the conversion of starch in aqeous acid medium. —O. J. Meijer's Dextrinefabrieken N.V. April 17, 1942. 608,146.

Method of producing vanillin.—Ontario Paper Co., Ltd. July 9, 1945. 607,978.

Methods for the production of such glucosides of polyhydroxy compounds of the cyclopentano-polyhydro-phenanthrene ring system as have at least one free hydroxy group in the cyclopentanophenanthrene ring. Lovens Kemiske Fabrik Ved. A. Kongsted. May 29, 1941. 607,980.

Fumigation and fumigating compositions. —I.C.I., Ltd., and J. Taylor. Feb. 11, 1946. 607,982.

Obtaining valuable light-oil fractions from fuel distillates.—Koppers Co., Inc. Nov. 21, 1942. 608,266.

Production of partially hydrolysed vinyl ester polymers and interpolymers.—E. I. Du Pont de Nemours & Co. Feb. 13, 1945. 607,911.

Method for the production of 2-methylimidazolines substituted in the methyl group with an aromatic nucleus.—Lovens Kemiske Fabrik Ved. A. Kongsted. July 9, 1941. 608,067.

Manufacture of chlorine dioxide.—Mathieson Alkali Works. March 12, 1945. 608,068.

Chlorine-dioxide-producing compositions. Mathieson Alkali Works. March 16, 1945. 608,069.

Scouring of cellulose textile materials.— Mathieson Alkali Works. March 24, 1945. 607,916.

Process for the manufacture of asphaltic bitumens.—N.V. de Bataafsche Petroleum Maatschappij. Nov. 8, 1940. 608,076.

Gas separation process.—Carbide & Carbon Chemicals Corporation. March 6, 1945. 608,091.

Production of organic fluorine compounds. —I.C.I., Ltd., and W. B. Whalley. Feb. 15, 1946. 608,111.

Manufacture of diazo-dyestuffs containing copper in complex union.—Clayton Aniline Co., Ltd., J. A. Schedler, and R. Whalley. Feb. 15, 1946. 608,115.

Manufacture of reductic acid.—Koninklijke Industrielle Maatschappij Voorheen Noury & Van Der Lande N.V. April 8, 1942. 608,165.

Method of preparing guanamine-aldehyde condensation products.—W. W. Triggs. Feb. 18, 1946. 608,186.

Apparatus for separating resin and other impurities from producer gas.—E. Prat. Aug. 24, 1942. 608,196.

Polymerisation of vinyl ethers.—General Aniline & Film Corporation. Feb. 21, 1945. 608,202.

Production of infusible drying oil products.—Bakelite, Ltd. Feb. 20, 1945. 608,204.

Process for the preparation of phenthiazine derivatives.—Soc. des Usines Chimiques Rhone-Poulenc. March 5, 1945. 608,208.

Extraction of protein from seeds.—Courtaulds, Ltd., R. L. Wormell, A. F. Millidge, and C. L. Knight. Feb. 19, 1946. 608,269.

Process of making secondary polyhydroxyalkylaryl amines.—Hoffmann La-Roche, Inc. Dec. 15, 1944. 608,272.

Production of dyestuffs.—Ilford, Ltd., J. D. Kendall, and J. R. Majer. March 1, 1946. 607,918.

Detergent dispensing device.—J. G. Donaldson. March 5, 1946. 608,210.

Bituminous compositions.—R. D. Swan. March 7, 1946. 608,286.

Preparation of tertiary amino aromatic aldehydes.—E. I. Du Pont de Nemours & Co. March 9, 1945. 607,920.

Treatment of cotton fibres.—United States Rubber Co. June 22, 1945. 608,292.

Manufacture of synthetic resinous condensation products.—Beck, Koller, & Co. (England), Ltd., E. A. Bevan, and R. S. Robinson. March 27, 1946. 608,023.

Control apparatus for furnace installations and chemical plants.—H. Balfour & Co., Ltd., W. L. Burns, and J. W. Gibson. April 4, 1946. 608,294.

Manufacture of imidazolines.—Ciba, Ltd. June 6, 1945. 608,295.

Manufacture of imidazolines.—Ciba, Ltd. June 6, 1945. 608,296.

Manufacture of resinous condensation products.—Beck, Koller, & Co. (England), Ltd., E. A. Bevan, and R. S. Robinson. June 4, 1946. 608,027.

Apparatus for proportioning sodium metaphosphate to water.—A. H. Wallentin, H. O. Carlsson, and J. H. Vesterlund. April 9, 1942. 608,577.

Alloys for addition to steel alloys for the deactivation of nitrogen and oxygen therein. —A. H. Stevens. (E. D. Bransome.) Dec. 30, 1942. 608,486.

Preparation of colloidal aqueous dispersions of partially polymerised anionic dimethylol urea or dimethylol urea ether and methods of treating fibrous materials with said dispersions.—American Cyanamid Co. Oct. 31, 1942. 608,487.

Self-sealing submersible air ducts and armoured military vehicles comprising the same. Imperial Chemical Industries, Ltd., W. J. S. Naunton, and J. T. Watts. Feb. 15, 1944. 608,488.

Production of metallic magnesium by ferrosilicon reduction.—Dominion Magnesium, Ltd. Oct. 18, 1943. 608,573.

Igniters for mercury arc-discharge tubes. —G. B. Banks. March 8, 1945. 608,589.

Mercury-arc discharge devices of the kind having a mercury-pool cathode.—G. B. Banks. March 9, 1945. 608,590.

Amino-alkyl esters of diphenylamine 2-mono-carboxylic acids.—Ward, Blenkinsop & Co., Ltd., A. A. Goldberg, and H. S. Turner. May 7, 1945. 608,492.

CLASSIFIED ADVERTISEMENTS

EDUCATIONAL

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